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THE ACCOUNTING REVIEW

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Introducing the First Management Control Systems: Evidence from the Retail Sector

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Editor's Letter

I am happy to share with you the news that I have decided to *reinstate the book review section* of *The Accounting Review*. This section had been included in our journal from its founding in 1926 but had lapsed, briefly. It will appear again in 2007.

Because books and monographs are not peer-reviewed as are articles in refereed journals, it is valuable for them to be screened by independent and objective reviewers in leading research journals such as *TAR*. Textbooks and instructional materials will continue to be reviewed in *Issues in Accounting Education*.

Stephen Zeff, at Rice University, has agreed to serve as book review editor—a position he previously held from 1962–1966. Authors and publishers of treatises and other studies should send two copies of each book they wish to be considered for review to Professor Zeff. He will then identify appropriate texts to be evaluated, as well as the individuals who will do so.

Assigned reviewers of books are to communicate directly with Professor Zeff and send a copy to *TAR* only for their final book reviews.

Unsolicited reviews will not be accepted. The book review editor's information is as follows:

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I look forward to providing a venue for the discussion of scholarly works.

Sincerely,
Dan Dhaliwal
Senior Editor, *The Accounting Review*

Segment Profitability, Misvaluation, and Corporate Divestment

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ABSTRACT: This paper develops a theoretical model to explain corporate divestment in the context of accounting-based valuation and provides empirical evidence to support the model's predictions. Building on Zhang's (2000) real-options-based equity value model, we develop a model to explain why firms with multiple business segments may have incentives in financial reporting to shift earnings from one segment to another to influence market valuation. Cross-segment earnings shifting, however, causes information asymmetry about segmental performance, which leads to market misvaluation. Divestment arises as a voluntary commitment by (some) firms to not engage in segmental earnings manipulation, with the aim of restoring valuation accuracy. Our theoretical analysis yields a number of testable implications. Consistent with our model's predictions, we find empirically that (1) divestment is preceded by an increased divergence in profitability between the divested and continuing segments of the divesting firm, (2) there are positive abnormal stock returns surrounding divestment announcements that are not dependent on increased expectations about future operating performance, (3) the magnitude of market revaluation increases with the profitability divergence between the divested and continuing segments, and (4) market revaluation is greater for more complex firms (in terms of having a larger number of segments and greater uncertainty facing investors).

Keywords: *segment profitability; earnings manipulation; misvaluation; corporate divestment; information symmetry.*

Data Availability: *Data used in this study are available from public sources.*

We appreciate the comments of two anonymous referees, Gary Biddle, Henry Cao, Amihud Dotan, Hyunkoo Lee, Jing Liu, Steven Matsunaga, James Ohlson, Terry Shevlin (editor), TJ Wong, Chun Zhang, and workshop participants at the China-Europe International Business School, the Hong Kong University of Science and Technology, and the 2004 Accounting and Finance Conference at Cheung Kong Graduate School of Business. All errors are our own. Professor Zhang acknowledges financial support by Hong Kong Research Grants Council Direct Allocation Grants (DAG04/05.BM16).

Editor's note: This paper was accepted by Terry Shevlin.

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I. INTRODUCTION

Divestment of segments of businesses is an important part of corporate restructuring in today's business world.¹ Empirical evidence shows that divestment does not simply change the organizational structure of a firm; it often has significant consequences for the firm's market value. One of the motives for divestment, as is often claimed by firms undergoing such restructuring, is to correct market misvaluation. For example, Nanda and Narayanan (1997) report that for their sample of 102 firms undertaking divestment, 45 percent cite undervaluation as the reason (or one of the reasons) for doing so.² Such claims are echoed by financial analysts who argue that divestment enables them to better assess the real worth of assets whose values have been obscured by the complexities of conglomerate corporate structures (Schipper and Smith 1984; Gilson et al. 2001). However, traditional valuation models do not offer a ready justification for such claims. Questions remain as to why firms with multiple businesses are more prone to misvaluation and how divestment helps to restore valuation accuracy. Furthermore, if the role of divestment is to provide more information for investors, why can the same effect not be achieved through disclosure of segment-level data, which presumably is a less costly alternative (Gilson et al. 2001)?

In this paper, we develop an accounting-based valuation model to explain that misvaluation of multiple-segment firms can occur because such firms have incentives to manipulate reported segment earnings, thereby making it difficult for investors to know the true segment-level performances, and that corporate divestment arises as a solution to the misvaluation problem in situations where the accounting system fails to provide information truthfully. Our theory is developed from real-options-based valuation models (e.g., Burgstahler and Dichev 1997; Zhang 2000; Chen and Zhang 2003). Important implications of these models is that the mapping of accounting earnings to value depends on operating profitability and, for a multiple-segment firm, the earnings produced by different segments have different valuation consequences. Thus, in a world where investors rely on a firm's self-reported accounting data for valuation, the combining of multiple businesses into a single reporting entity potentially creates a peculiar source of misvaluation, attributed to the firm's incentive (coupled with its ability) to shift *reported* earnings from one segment to another. Divestment serves as a commitment by (some) firms to not engage in cross-segment earnings shifting, thus leading to more credible financial reporting and more accurate valuations.

Our model generates distinctive predictions about the circumstances and consequences associated with divestment: (1) divestment is preceded by an increased divergence of profitability between the divested and continuing segments of the divesting firm; (2) there is a positive market reaction to divestment, and this upward market revaluation is not dependent on expected improvement in operating performance; (3) the magnitude of the revaluation is positively related to the divergence of profitability between the divested and continuing segments; and (4) the revaluation is greater for more complex firms (in terms of having a

¹ In this paper, the term "divestment" refers to both sell-offs and spin-offs, which involve separation of a business from its parent firm either to form a separate firm or to become part of another firm.

² Nanda and Narayanan (1997) focus on a sample of equity carve-outs. In our sample described below, consisting of 99 spin-offs and 455 sell-offs, misvaluation was the/a stated reason in 24 percent of the cases. For instance, the CEO of Tenneco Inc. gave the following explanation for the sale of the company's oil subsidiary: "In recent years, the steady decline in oil prices on the world market, combined with the high cost of replacing reserves, clouded the company's prospects for future profitability. We also recognized that our properties and operations represented substantial value that was not being reflected in our stock price and which could best be unlocked by their sale" (the 1988 Annual Report of Tenneco Inc., page 3).

larger number of segments and greater uncertainty facing investors). Our empirical results from a sample of 554 divestments from 1990 through 2001 are consistent with these predictions.

Prior research has suggested that gains in market value at the time of divestment arise from reduced information asymmetry, but this general information-based explanation is not linked to a specific valuation model; as such, it does not explain how, and under what conditions, misvaluation arises. In a related study, Nanda and Narayanan (1997) provide a model showing that undervalued firms may undertake divestment to correct misvaluation. However, their model abstracts away the role of accounting data in informing investors about firm value, and the cause of information asymmetry is unidentified and not linked to the firm's rational choices; as such, it is not clear why the firm has to rely on divestment (as opposed to less costly segment reporting) to reduce information asymmetry. In contrast, our study shows that information asymmetry is not easily resolved through financial reporting because the problem is *caused* by the firm's opportunistic reporting as induced by a nonlinear valuation function. Empirical results indicate that our valuation-based explanation is distinct from the previous information-based explanation.

Existing studies have also considered other motives for divestment, which are aimed at improving operating cash flows. These include correction of past investment mistakes (Ravenscraft and Scherer 1987; Weisbach 1995), maintaining corporate focus and eliminating negative synergy/cross-subsidization (John and Ofek 1995; Daley et al. 1997), sale of assets that are worth more to the buyer than to the seller (Linn and Rozeff 1984), and improved managerial incentives resulting from better contracting (Schipper and Smith 1983; Aron 1991). However, evidence shows that divestment does not always lead to improved operating efficiency, and yet the market still reacts positively to such events (e.g., Daley et al. 1997; Desai and Jain 1999). We rationalize this phenomenon by demonstrating theoretically that divestment can be driven purely by valuation-related motives and positive market reactions to divestments are not conditional on expected improvements in operating performance. It is possible that divestments undertaken by different firms are driven by different motives. Our empirical results suggest that our valuation-based motive complements (rather than rules out) other motives for divestment.

The remainder of this paper is organized as follows. Section II develops the theory and testable implications. Section III reports the empirical results. Section IV concludes the paper. The proofs of the theoretical results are excluded from the paper (they are available from the authors upon request).

II. THE MODEL AND PREDICTIONS

This section develops a theoretical model to explain corporate divestment in the context of accounting-based valuation. We first derive the value of a multiple-segment firm based on accounting fundamentals under the condition of information symmetry. We then introduce information asymmetry and show that the market value of the firm, determined on the basis of reported data, can deviate from its intrinsic value. Divestment is then introduced to mitigate the misvaluation problem.

For simplicity, we abstract away operational and accounting issues that are nonessential to the development of our argument. A key feature of our setting is the existence of real

options at the segment level.³ Without loss of generality, we assume risk neutrality and set the riskless interest rate to zero.

Valuation of a Multiple-Segment Firm: The Case of Information Symmetry The Basic Setting

In this basic setting, we assume information symmetry between the firm's manager and external investors. This enables us to establish the relation between equity value and "true" (as opposed to "reported") accounting data.

Consider a two-segment firm in a three-period world.⁴ At date 0 (beginning of period 1), the firm is established with two operating assets (segments), referred to as asset i and asset j , respectively. The size of asset i (j) is measured by its acquisition cost, denoted as A_i (A_j).⁵ The firm will last for at most three periods, and it faces the following sequential decisions. At date 1, the firm either divests one of its segments (in the form of sell-off or spin-off) or continues operations with both segments. At date 2, the firm decides whether to liquidate its remaining segment(s).⁶ At date 3, the firm liquidates any remaining segment(s) and ceases to exist. At either date 2 or 3, upon liquidating a segment, the firm recovers a value, equal to $(1 - c_i)A_i$ from segment i and $(1 - c_j)A_j$ from segment j , where c_i and c_j represent the costs of liquidation.

For simplicity, we assume that the level of asset stock in each segment remains unchanged over time until the segment is divested or liquidated. Each segment produces stochastic operating earnings at date 1 and, if it continues to be part of the firm, at date 2 and date 3. Let x_{is} be the earnings of asset i at date s , $s = 1, 2, 3$, and $q_{is} \equiv x_{is}/A_i$ be the corresponding operating profitability. The profitability of asset i evolves as follows:⁷

$$\bar{q}_{is} = q_{is-1} + \bar{e}_{is}, \quad s = 1, 2, 3, \quad (1)$$

where $\bar{e}_{is}$ is a zero-mean random term realized at date s . Similar assumptions are made concerning asset j . We further assume $-1 < \text{cov}(\bar{e}_{is}, \bar{e}_{js}) < 1$, $s = 1, 2, 3$.

At date 0, the firm and the market have the same expectations about the profitability of the two assets, denoted q_{i0} and q_{j0} , respectively. Both assets are initially profitable at date 0; with a zero interest rate, this implies $q_{i0} > 0$ and $q_{j0} > 0$.

At date 1, random shocks e_{i1} and e_{j1} are realized, and segment earnings $x_{i1} \equiv A_i q_{i1}$ and $x_{j1} \equiv A_j q_{j1}$ become known. The firm's aggregate earnings are $x_1 = x_{i1} + x_{j1}$, and the aggregate profitability is $q_1 = x_1/(A_i + A_j) = q_{i1}A_i/(A_i + A_j) + q_{j1}A_j/(A_i + A_j)$.

³ See, for example, Myers (1977), Amram and Kulatilaka (2000), and Damodaran (2000) for the importance of real options in valuation. While our model only considers options associated with liquidation (versus continuation), the main results are valid when growth options are also introduced.

⁴ Our model covers three time periods, but the basic results are valid in a longer time frame as long as the ranking of the performances of a firm's segments does not change frequently from period to period.

⁵ For simplicity, we focus directly on the economic information conveyed by accounting data, without modeling accounting conservatism. The underlying accounting rules are: historical cost accounting, the clean surplus relation, and unbiased depreciation (see Feltham and Ohlson 1996; Zhang 2000; Biddle et al. 2001). Under these conditions, book value properly measures the size of asset stock (without biases) and accounting earnings become equivalent to economic earnings. However, our qualitative results can be extended to settings with conservative accounting (see Zhang 2000).

⁶ The difference between "divestment" and "liquidation" here is that a segment ceases to exist if liquidated but goes on as (part of) another company if divested.

⁷ We employ a random walk process for simplicity. As Zhang (2000) points out, the qualitative properties of the valuation function (such as convexity) hold more generally as long as current profitability is informative about future profitability (as would be satisfied, for example, by a mean reversion process).

Intrinsic Value of the Firm at Date 1

We first derive the firm value at date 1 assuming no divestment at date 1. For each segment, the value equals the present value of cash flows arising from earnings and liquidation. The possibility of liquidation at date 2 sets a lower limit on a segment's value. It can be shown that the optimal decision at date 2 concerning segment i is to continue the operation if $q_{i2} > 0$, and to liquidate otherwise.⁸ The value of segment i at date 1, conditional on (x_{i1}, A_i) , can be derived as:⁹

$$V(q_{i1}; A_i) = (1 - c_i)A_i + q_{i1}A_i + A_i C(q_{i1}), \quad (2)$$

where $C(q_{i1}) \equiv \int_{-q_{i1}}^b (q_{i1} + \tilde{e}_{i2})g(\tilde{e}_{i2})d\tilde{e}_{i2}$ is the call option to continue the operation at date 2 (versus liquidation), with $g(\tilde{e}_{i2})$ being the probability density function of $\tilde{e}_{i2} \in [a, b]$, $a < 0$, $b > 0$. Equation (2) shows that a segment's value equals the sum of the liquidation value, earnings before liquidation, and the option to continue the segment.¹⁰ Combining the two segments, we obtain the firm value at date 1 as:¹¹

$$V \equiv V(q_{i1}; A_i) + V(q_{j1}; A_j) = (1 - c_i)A_i + (1 - c_j)A_j + (x_{i1} + x_{j1}) + A_i C(q_{i1}) + A_j C(q_{j1}). \quad (3)$$

The properties of call options suggest that firm value (V) is an increasing and convex function of segment profitabilities (q_{i1}, q_{j1}) . Without loss of generality, we label segment i as the less profitable of the two, $q_{i1} < q_{j1}$. Lemma 1 follows from the convexity of the valuation function.¹²

Lemma 1: Valuation function (3) has the following properties:

- (i) $\frac{\partial V}{\partial x_{i1}} < \frac{\partial V}{\partial x_{j1}}$ if and only if $q_{i1} < q_{j1}$, and
- (ii) given aggregate profitability q_i , V increases with the divergence of segment profitability, $q_{j1} - q_{i1}$.

According to part (i) of Lemma 1, the earnings of a more profitable segment have a greater marginal effect on firm value than the earnings of a less profitable segment. Part (ii) states that given aggregate profitability, the total firm value is greater if the two segments are more divergent in profitability.

⁸ At date 2, the firm either liquidates asset i , recovering $(1 - c_i)A_i$, or continues its operations with an expected cash flow at date 3 of $q_{i2}A_i + (1 - c_i)A_i$. Thus, it is optimal to continue the operation of segment i if and only if $q_{i2} > 0$.

⁹ This valuation function is a special case of the model derived in Zhang (2000).

¹⁰ Based on the put-call parity condition, $V(x_{i1}; A_i)$ can be equivalently viewed as the value from maintaining the operation plus the (put) option to liquidate.

¹¹ While there may exist operating synergies or other interactive effects (such as tax benefits) between segments, which may explain the initial formation of multiple-segment firms, such effects are not explicitly considered here. If included, they can be viewed as additional costs/benefits of divestment in this model, without changing our qualitative results. The purpose of this paper is to explain why market misvaluation can cause *existing* multiple-segment firms to break up (even when synergies are lost).

¹² The proofs of all theoretical results are available upon request from the authors.

These properties are in contrast to linear valuation models where the marginal value impact of a segment's earnings will remain constant. In our setting, it is not possible to assert *a priori* the valuation implication of a given amount of earnings. Between the two segments, a dollar of earnings is attached to a greater value if it is produced by a segment that is comparatively more profitable. The intuition is as follows. Within a real-options framework, the value of a segment depends on both the amount of future cash flows (if operations continue) and the probability that operations will continue. As a segment becomes more profitable, the chance that its operations will continue into the future increases and, therefore, its earnings are expected to be more persistent. As a result, earnings of a more profitable segment have a greater effect on firm value.¹³

Market Misvaluation and the Decision to Divest: The Case of Information Asymmetry

In reality, investors do not directly observe firms' operating results, so they rely on reported data to determine firm value. But reported data can be influenced by a firm's accounting practice. In the context of a multiple-segment firm, reported segment data depend on the particular accounting methods that the firm uses to allocate revenues and expenses internally. The lack of standards to regulate internal accounting practice gives firms much leeway in "allocating" earnings among segments. The issues of concern are whether firms have incentives to report segment-level performances truthfully and how the market values a firm based on *reported* segment data.

To examine these issues, we now modify the above basic setting. We continue to assume information symmetry at date 0;¹⁴ that is, the firm's manager and outside investors both observe the initial investments, A_i and A_j , and have the same initial expectations about segment profitability, q_{i0} and q_{j0} .

At date 1 when the firm completes period 1 operations, the manager observes segment earnings, $x_{i1} = A_i q_{i1}$ and $x_{j1} = A_j q_{j1}$, but investors do not. As before, we designate segment i to be the less profitable segment of the two; that is, $q_{i1} < q_{j1}$.

The firm reports x'_{i1} and x'_{j1} as the earnings of segment i and segment j , respectively. We assume that while reported segment earnings may or may not deviate from true segment earnings, the aggregate earnings, $x_1 = A_i q_{i1} + A_j q_{j1}$, are always *truthfully* reported to the market.¹⁵ Thus, we can express reported segment earnings as $x'_{i1} = x_{i1} - t$ and $x'_{j1} = x_{j1} + t$, where t represents the amount of earnings transferred from segment i to j (t can be positive or negative in general).

As a practical matter, however, the extent of earnings shifting between segments is not unlimited. Firms are subject to external reporting standards (coupled with independent auditing), and there may well be internal resistance from those segments whose performance measures are adversely affected by the firm's accounting practice. Let t_m be the *maximum*

¹³ Sometimes, managers may also try to cover up losses in poor-performing segments, which suggests earnings shifting from more profitable to less profitable segments. This type of earnings shifting does not exist in our theoretical model. Empirically, the existence of such incentives makes it more difficult to find results consistent with our predictions.

¹⁴ As in Myers and Majluf (1984), the assumption of information *symmetry* at the initial date simplifies the analysis. The essential condition we require is that there is less information asymmetry at the beginning relative to a subsequent point when profitability shocks occur.

¹⁵ We do not consider the possibility of earnings management across time periods; our focus is on market misvaluation caused by information asymmetry regarding the relative performances between segments, an issue unique to multiple-segment firms. Generally speaking, cross-period earnings management is a separate issue from cross-segment earnings shifting, and the former is not likely to substantially change a firm's incentives for the latter.

amount of earnings that can be transferred between segments (in either direction); this is a firm-specific parameter that will depend on such factors as the level of cross-segment transactions, the extent of common resource sharing, and the bargaining power of segment managers. Investors, however, do not observe t_m , and they assess a distribution of t_m over range $[0, T]$.

To keep our analysis simple, we make the following two assumptions:¹⁶

Assumption 1: $q'_{i1} < q'_{j1}$, given $q_{i1} < q_{j1}$.

Assumption 2: (i) Unexpected shocks to segment profitabilities at date 1 (given in Equation (1)), e_{i1} and e_{j1} , both have a uniform distribution over range $[a, b]$, with $a < 0$ and $b > 0$; and (ii) the distribution of t_m is uniform over range $[0, T]$.

Assumption 1 conveys that the external and internal constraints governing the firm's financial reporting practice are such that reported data preserve the ranking of true segmental performances.¹⁷ Assumption 2 is imposed for technical tractability.

Incentives to Manipulate Segment Earnings

We now examine the firm's reporting behavior. Lemma 2 rules out truthful reporting as an equilibrium strategy of the firm.

Lemma 2: If the market accepts reported data as being truthful, $(x'_{i1}, x'_{j1}) = (x_{i1}, x_{j1})$, then $dV/dt > 0$ at $t = 0$.

At $t = 0$ (i.e., zero earnings transfer between segments), reporting is truthful. If the market simply accepted the reported segment earnings as being truthful, then the firm would be able to increase its market value by choosing $t > 0$, i.e., shifting earnings from segment i (less profitable) to segment j , to widen the divergence of reported profitability between segments. This follows from part (ii) of Lemma 1. Thus, truthful reporting cannot be sustained in equilibrium.¹⁸ The firm's incentive to shift earnings across segments gives rise to investors' concerns about the credibility of reported segment earnings.¹⁹

Market Inferences and Valuation Based on Reported Data

While investors can anticipate the firm's incentive to manipulate segment earnings, they do not observe the extent of manipulation, and in general they cannot perfectly correct the distortions in the reported data. Denote $(\hat{x}_{i1}, \hat{x}_{j1})$ as segment earnings as inferred by the

¹⁶ These assumptions are needed to reduce the complexity of the derivations. However, the intuitions conveyed by our results have more general appeal.

¹⁷ This condition is plausible and appears more natural in the empirical context than the opposite case; it suggests that segment disclosures in practice are still meaningful for cross-segment comparison although reported data may have been distorted. Theoretically, this assumption is justified in the sense that in the equilibrium derived below, the firm does not have an incentive to deviate from the condition specified in Assumption 1.

¹⁸ Manipulation of segment earnings in our context differs from the notion of "cross-subsidization" in internal resource allocation (i.e., diverting more resources to poor-performing segments) as suggested in earlier studies (Berger and Ofek 1995). The former is a financial reporting issue concerning how the firm reports to external investors about its operations, whereas the latter relates to "real" activities that have a direct impact on operating results. We do not consider cross-subsidization in this study.

¹⁹ Another factor that can influence reported segment data is proprietary costs of disclosure. Such costs are not considered in our model. Our theoretical results can be extended to a more general setting as long as the incentives to shift segment earnings as induced by the nonlinear valuation function are not completely offset by the incentives arising from managers' considerations for proprietary costs of disclosure.

market, conditional on reported data, with $\hat{x}_{i1} + \hat{x}_{j1} = x'_{i1} + x'_{j1} = x_1$, and $(\hat{q}_{i1}, \hat{q}_{j1})$ as the inferred segment profitabilities. Thus, $\tau \equiv \hat{x}_{j1} - x'_{i1}$ is the correction that the market makes to reported earnings in inferring true segment earnings, which is the amount of earnings added back to segment i from segment j .

Define $D \equiv q'_{j1} - q'_{i1} \geq 0$ as the divergence of reported segment profitability. Then, given (q_1, D) , reported segment profitabilities can be expressed as $q'_{i1} = q_1 - \frac{A_j}{A_i + A_j} D$ and $q'_{j1} = q_1 + \frac{A_i}{A_i + A_j} D$. The true segment profitabilities are:

$$q_{i1} = q'_{i1} + \frac{t}{A_i} = q_1 - \frac{A_j}{A_i + A_j} D + \frac{t}{A_i}, \text{ and } q_{j1} = q'_{j1} - \frac{t}{A_j} = q_1 + \frac{A_i}{A_i + A_j} D - \frac{t}{A_j}.$$

Conditional on the reported divergence, D , the market forms beliefs about the distribution of t , as represented by density function $f(t; D)$, $t \in [-T, \tau_1]$, where $\tau_1 = \min \left\{ T, \frac{A_i A_j}{A_i + A_j} D \right\}$ is the (conditional) upper bound of t .²⁰ With uncertainty about t , investors need to compute the expected firm value over the range of possible values of t . The market value at date 1 upon observing (q'_1, q'_{j1}) , or equivalently (q_1, D) , is determined as:

$$\begin{aligned} MV(q'_{i1}, q'_{j1}) &= MV(q_1; D) \\ &= \int_{-T}^{\tau_1} \left[V\left(q'_{i1} + \frac{t}{A_i}; A_i\right) + V\left(q'_{j1} - \frac{t}{A_j}; A_j\right) \right] f(t; D) dt \\ &= \int_{-T}^{\tau_1} \left[V\left(q_1 - \frac{A_j}{A_i + A_j} D + \frac{t}{A_i}; A_i\right) \right. \\ &\quad \left. + V\left(q_1 + \frac{A_i}{A_i + A_j} D - \frac{t}{A_j}; A_j\right) \right] f(t; D) dt. \end{aligned} \quad (4)$$

Corresponding to this market value, there is a unique value of τ (the extent of market correction to reported segment earnings) and a pair of inferred segment probabilities $(\hat{q}_{i1}, \hat{q}_{j1})$. Their relations are as follows:

$$V\left(q'_{i1} + \frac{\tau}{A_i}; A_i\right) + V\left(q'_{j1} - \frac{\tau}{A_j}; A_j\right) \equiv V(\hat{q}_{i1}; A_i) + V(\hat{q}_{j1}; A_j) = MV(q'_{i1}, q'_{j1}). \quad (5)$$

For any given pair of true segment profitabilities, (q_{i1}, q_{j1}) , the firm's decision is to determine t , which maximizes the market value (4), subject to t_m .²¹

$$\text{Max, } MV(q_1; D), \text{ subject to } -t_m \leq t \leq t_m. \quad (6)$$

²⁰ For generality, at this point, we do not rule out the possibility that the firm transfers earnings in the direction from segment j to segment i ; that is, we allow $-T < t < 0$. Also note that given Assumption 1, the maximum earnings transfer from segment i to j cannot exceed $\frac{A_i A_j}{A_i + A_j} D$.

²¹ The firm's manager is interested in increasing current stock prices for a number of reasons, such as reducing the cost of external financing, increasing the value of stock options awarded to him as compensation, and lowering the risk of the firm being taken over.

Definition: The equilibrium is a combination of (i) the firm's choice of the earnings transfer, $t = t^*$, conditional on (x_{i1}, x_{j1}) and t_m ; and (ii) the market's correction to reported segment earnings, $\tau = \tau^*$, conditional on D , such that Equations (4), (5), and (6) are simultaneously satisfied.

We first provide Lemma 3 concerning the relation between the market value and the divergence of reported segment profitability, which is derived from Equation (4).

Lemma 3: Under Assumption 1, given aggregate profitability q_1 , the market value of the firm increases with the divergence of *reported* segment profitability, $\frac{dMV}{dD} > 0$.

Lemma 3 leads to the following result about the equilibrium:

Proposition 1: Under Assumption 1, in equilibrium, (i) the market's correction to segment earnings (τ^*) is such that the inferred profitability divergence ($\hat{q}_{j1} - \hat{q}_{i1}$) increases with the reported profitability divergence (D); and (ii) the firm transfers earnings from segment i (less profitable) to segment j , with the amount of transfer being $t^* = t_m$ if $t_m < [A_i A_j / (A_i + A_j)]D$, and $t^* = [A_i A_j / (A_i + A_j)]D$ otherwise.

The reported profitability divergence (D) is a combination of true profitability divergence and cross-segment earnings shifting. An increase in D can be caused by a greater divergence of true segment profitabilities, a larger amount of earnings shifting, or both. Part (i) of Proposition 1 confirms the intuition that, in equilibrium, as the reported divergence increases, the market expects true profitabilities to be more divergent also.

Part (ii) shows that, in response to the market's inferences, the firm attempts to make the reported profitabilities as far apart as it can by transferring earnings from the less profitable to the more profitable segment. Thus, in equilibrium, the range of distribution of t^* narrows to $[0, \tau_1]$.²²

The market's correction to reported segment earnings (τ^*) is generally different from actual earnings shifting (t^*). Following Lemma 1, undervaluation occurs if the actual earnings shifting is less than the amount corrected by the market, $\tau^* > t^*$, so that the inferred profitability divergence is smaller than the actual divergence ($\hat{q}_{j1} - \hat{q}_{i1} < q_{j1} - q_{i1}$). On the other hand, overvaluation occurs if $\tau^* < t^*$.

Reported Profitability Divergence and the Degree of Undervaluation

We now consider the issue of *how much* a firm may be undervalued in equilibrium. Lemma 4 follows from Assumptions 1 and 2.

Lemma 4: Under Assumptions 1 and 2, for a given q_1 , $d\tau^*/dD > 0$.

Lemma 4 states that as the reported profitability divergence increases, the market makes a larger correction to the reported segment earnings. This is because, on average, a greater reported profitability divergence is associated with more earnings manipulation.

²² Lemma 3 continues to hold if we recognize t^* as distributed over $[0, \tau_1]$.

If the actual earnings transfer made by the firm t^* is within range $[0, \tau^*]$, then the firm is undervalued. We define the amount of undervaluation (V^u) as:

$$\begin{aligned} V^u &\equiv [V(q_{ii}; A_i) + V(q_{ji}; A_j)] - [V(\hat{q}_{ii}; A_i) + V(\hat{q}_{ji}; A_j)] \\ &= \left[V\left(q_1 - \frac{A_j}{A_i + A_j} D + \frac{t_m}{A_i}; A_i\right) + V\left(q_1 + \frac{A_i}{A_i + A_j} D - \frac{t_m}{A_j}; A_j\right) \right] \\ &\quad - \left[V\left(q_1 - \frac{A_j}{A_i + A_j} D + \frac{\tau^*}{A_i}; A_i\right) + V\left(q_1 + \frac{A_i}{A_i + A_j} D - \frac{\tau^*}{A_j}; A_j\right) \right]. \end{aligned} \quad (7)$$

Conditional on the firm's being undervalued, $t^* = t_m$ is uniformly distributed over $[0, \tau^*]$, with the probability density equal to $1/\tau^*$, given that t_m is uniformly distributed. The expected amount of undervaluation is:

$$EV^u = \int_0^{\tau^*} V^u \frac{1}{\tau^*} dt_m. \quad (8)$$

Proposition 2 shows that, in equilibrium, the conditional expected undervaluation increases with D .

Proposition 2: In equilibrium, conditional on the firm's being undervalued, $dEV^u/dD > 0$.

Firm Complexity and the Degree of Undervaluation

Parameter T is the upper bound of the distribution of t_m , as perceived by the market. This reflects the market's view of how much the firm is potentially able to shift earnings across segments. In general, T should depend on the complexity of a firm's organization structure. As the firm's structure becomes more complex, investors are less clear about what is taking place within the firm, and they suspect that there may be a greater potential for segment earnings manipulation (hence, a greater upper bound T). The next proposition shows the equilibrium relation between the expected degree of undervaluation, conditional on the firm's being undervalued, and T .

Proposition 3: In equilibrium, conditional on the firm's being undervalued, $dEV^u/dT > 0$.

Decision to Divest

The theoretical analysis so far shows that misvaluation generally occurs when different segments are combined into a single reporting entity. With firm value being a convex function of segment earnings, the firm has incentives to shift earnings from one segment to another to increase market valuation, but this poses a credibility problem that is peculiar to multiple-segment firms. The market cannot discern whether the reported segment data are a truthful representation of actual performances or a result of earnings manipulation. Consequently, firms that truly have high value are unable to convince the market through financial reporting that they deserve a high valuation.

Divestment provides a solution to this misvaluation problem. In effect, divestment cuts off potential accounting interference between different businesses formerly belonging to a

common entity. As a result, it increases the quality of reported data and enables investors to obtain more accurate valuations.

Obviously, a firm interested in increasing the market value will undertake divestment only if it is undervalued. Furthermore, if corporate divestment is costly (e.g., direct transaction costs and losses of synergy, tax benefits, and firm-specific investment in the divested segment), the cost of divestment needs to be compensated for. Let c_d be the cost of divestment borne by the firm.²³ The firm divests at date 1, if and only if:

$$V^u \equiv [V(q_{i1}; A_i) + V(q_{j1}; A_j)] - [V(\hat{q}_{i1}; A_i) + V(\hat{q}_{j1}; A_j)] > c_d. \quad (9)$$

Hypotheses

We now develop testable hypotheses from the above model concerning the circumstances and consequences associated with divestment.

Circumstances under which Divestment Takes Place

In our model, the two segments of the firm are initially both profitable at date 0. They then experience separate profitability shocks at date 1, which gives rise to information asymmetry and misvaluation. To justify a divestment, a firm has to be sufficiently undervalued so that the benefit of an upward valuation exceeds the cost of divestment. As shown in the model, the extent of undervaluation increases with the divergence of *reported* profitability between the divested and continuing segment(s). In other words, severely undervalued firms are among those that have wide divergences of reported segment profitabilities. From a dynamic perspective, this suggests that the divergence of reported segment profitability is greater at the time of the divestment decision than in the preceding years (when the firm does not find it justified to undertake divestment).

H1: Firms that undertake divestment report a greater divergence of segment profitabilities at the time of divestment than in the preceding years.

Market Reactions to Divestments

The decision to divest hinges on the cost-benefit trade-off; for firms undertaking divestment, there should be a positive net benefit from doing so. Thus, we expect a positive market reaction to the divestment decision.²⁴

An important feature of our model is that the increased market valuation is the result of reinterpreting a given amount of aggregate earnings, and it is not conditional on expected improvements in operating performances subsequent to divestment. This leads to our next hypothesis:

H2: (a) There is a positive stock price reaction to the divestment decision; and (b) the positive price reaction is not dependent on expected improvements in future operating performances.

²³ We assume a constant cost of divestment in the model. In the real world, this cost generally varies from firm to firm, but the basic intuition conveyed by the model should apply for any level of divestment cost.

²⁴ For situations where the firm chooses not to divest, our model would predict a downward market reaction. However, if the prior probability of divestment is low (as in the empirical setting), the magnitude of the downward reaction to no-divestment is expected to be negligible. In the Compustat database from which our divestment sample is extracted, only 4.7 percent of the firms undertake a divestment. With an average abnormal return surrounding the divestment decision of 2.2 percent for our sample (reported below), this implies that the average abnormal return in the event of no-divestment would be -0.11 percent (which is virtually undetectable in empirical tests).

Determinants of the Magnitude of Market Reaction

Proposition 2 shows that the degree of undervaluation, conditional on a firm's being undervalued, increases with the divergence of reported segment profitability. The decision to divest provides a signal that the firm is undervalued, and investors assess the extent of undervaluation and then adjust the price. Thus, we have H3:

H3: The positive market reaction to divestment increases with the divergence of reported profitability between the firm's divested and continuing segments.

Proposition 3 shows that, conditional on a firm's being undervalued, the degree of undervaluation is greater for firms with a more complex structure, which makes it more difficult for investors to disentangle reported earnings. The more complex is the firm's structure, the more uncertainty investors face about the extent of earnings manipulation, and the greater the potential for misvaluation. This provides the basis for H4:

H4: The positive price reaction to divestment is greater for firms with a more complex structure.

III. EMPIRICAL RESULTS

Sample and Descriptive Statistics

We focus on divestments involving disposal of a complete segment. We search all discontinued operations that are reported in income statements (data item #66) for the 12-year period 1990–2001 on the Compustat database. For each discontinued operation, we identify the year in which the divestment decision is made from the information disclosed in the annual report. We search the News Library on Lexis/Nexis to locate the first announcement date of each divestment. We exclude firms whose stocks were not traded on the New York or American Stock Exchange and firms that were in bankruptcy or had recently emerged from bankruptcy. Stock returns are retrieved from the CRSP tape. Segment data are retrieved from the Compustat Industry Segment file. We include only those divestments that have at least two years of required segment data prior to the divestment. The final sample consists of 554 segment divestments undertaken by 518 firms from 1990 to 2001. Each observation in our sample involves divestment of only one segment. The sample sizes for individual tests below, however, are further subject to the availability of other necessary data.

Panel A of Table 1 provides a breakdown of observations by year. The level of divestments is relatively high and remains steady during 1990–97, but drops substantially after 1997. Panel B shows the breakdown by the two-digit SIC of the parent company and of the divested segment. The SIC of the parent company is the primary SIC, and that of the divested segment is its first SIC.²⁵ The sample of divested segments spans a wide range of industries, including industrial machinery (7.6 percent), chemicals (7 percent), and oil and gas exploration (6.4 percent).

Table 2 presents the means and medians of key annual accounting measures of sample firms from five years before through two years after divestment. The year of divestment is labeled as year 0 (the base year), and all other years are defined relative to the base year. The mean and median values show that, in the years prior to divestment, divesting firms

²⁵ The Industry Segment Information file contains two SIC codes for each business segment.

exhibit a trend of increases both in total assets and in total sales, and a trend of decreases in income before extraordinary items both in the absolute amount and as a percentage of total assets.

Profitability Divergence between the Divested and Continuing Segments Prior to Divestment (H1)

Hypothesis 1 predicts a wider difference in *reported* profitability between the divested and continuing segments at the time of divestment than in the preceding years. To the best of our knowledge, existing studies have not made such a prediction. We use operating return (operating earnings divided by assets) to measure profitability, and compute the profitabilities of the divested and continuing segments from year -5 to year -1. The results are reported in Table 3.

Panel A of Table 3 shows that the sample mean (median) profitability of the divested segment exhibits a decreasing trend, from 9.0 percent (8.7 percent) in year -5 to -0.7 percent (3.7 percent) in year -1. The change in mean (median) profitability from year -5 to year -1 is significant at the 0.01 level. Panel B presents parallel data for the continuing segments. While there is also evidence of decreases in the mean and median profitability for continuing segments from year -5 to year -1, the extent of declines is much smaller than that for the divested segment, with the mean (median) profitability ranging from 10 percent (10 percent) in year -5 to 8.6 percent (8.8 percent) in year -1.

Panel C of Table 3 tests the profitability difference between the divested and continuing segments. In each of the five years preceding divestment, the divested segment underperforms the continuing segments (as indicated by the negative values). Immediately preceding divestment (year -1), the mean (median) divergence of profitability is 9.3 percent (5.1 percent), and this is significantly greater than the divergence in each of the previous four years from year -5 to year -2. This result is consistent with H1.

TABLE 1
Distributions of Divestments by Year and by Industry

Panel A: Distribution of Divestments by Year

<u>Year</u>	<u>Sell-Off</u>	<u>Spin-Off</u>	<u>Total</u>
1990	48	8	56
1991	45	11	56
1992	42	13	55
1993	46	17	63
1994	47	7	54
1995	39	8	47
1996	47	7	54
1997	50	8	58
1998	29	6	35
1999	22	7	29
2000	24	4	28
2001	16	3	19
Total	455	99	554

(continued on next page)

TABLE 1 (Continued)

Panel B: Distribution of Divesting Firms and Divested Segments by Industry

Industry	SIC	# of Divesting Firms	# of Divested Segments ^a	Industry	SIC	# of Divesting Firms	# of Divested Segments ^a
Agriculture	01	3	4	Air Transportation	45	1	4
Production				Transportation	47	1	3
Metals Mining	10	3	3	Service			
Coal Mining	12	1	5	Communications	48	14	13
Oil and Gas	13	27	35	Utilities	49	29	17
Exploration				Durable Goods	50	19	15
Nonmetal Mining	14	3	4	Nondurable Goods	51	17	14
Building	15	6	4	General Merchandise	53	7	5
Construction				Food Stores	54	3	1
Heavy Construction	16	2	2	Auto Dealers	55	2	1
Food Products	20	13	18	Apparel	56	3	3
Tobacco Products	21	4	1	Home Furniture	57	2	0
Textile Products	22	5	9	Restaurants	58	1	1
Apparel	23	1	4	Miscellaneous Retail	59	4	4
Lumber and Wood	24	4	3	Deposit Institutions	60	0	6
Furniture and	25	5	3	Non-depository	61	7	9
Fixtures				Credit			
Paper Products	26	10	10	Brokerage	62	1	5
Printing and Publishing	27	9	6	Insurance	63	13	26
Chemicals	28	35	39	Insurance Agents	64	2	2
Petroleum Refining	29	13	2	Real Estate	65	2	7
Rubber and Plastics	30	17	16	Holding Companies	67	0	3
Leather and Products	31	1	3	Hotels	70	1	3
Stone, Clay, Glass	32	6	12	Personal Services	72	3	2
Primary Metals	33	19	13	Business Services	73	20	26
Fabricated Metals	34	30	24	Auto Repairs	75	3	2
Indust. Mach. and	35	34	42	Misc. Repair	76	0	1
Comput.				Motion Pictures	78	1	2
Electricals	36	46	28	Amusements	79	4	3
Transportation	37	25	25	Health Services	80	5	6
Instrumentation	38	27	26	Education Services	82	2	1
Misc. Manufacturing	39	8	7	Professional Services	87	8	11
Railroads	40	8	1	Nonclassified	99	4	0
Motor Freight	42	5	5				
Water Transportation	44	5	3	TOTAL		554	554

^a The SIC code of the divested segment is the first SIC code of the segment from Compustat Industry Segment file.

TABLE 2
Selected Descriptive Statistics of Divesting Firms^a

Relative Year ^b	-5	-4	-3	-2	-1	0	+1	+2
Total Assets (\$million)	3,910 (522)	3,861 (531)	3,853 (525)	4,264 (582)	4,580 (667)	4,080 (618)	3,990 (637)	3,310 (712)
Annual Sales (\$million)	2,804 (587)	2,678 (556)	2,683 (584)	2,872 (615)	2,951 (662)	2,597 (563)	2,722 (647)	2,717 (773)
Annual Income before Extraordinary Items (\$million)	122.2 (13.6)	112.0 (13.0)	103.4 (11.7)	105.6 (13.4)	97.92 (11.3)	89.1 (6.87)	117.2 (12.9)	97.6 (16.9)
Income before Extraordinary Items as Percentage of Total Assets (%)	2.51 (3.77)	2.44 (3.62)	2.27 (3.11)	2.15 (2.86)	1.23 (2.40)	0.20 (2.01)	1.01 (2.88)	2.23 (3.45)

^a Mean (median) values of selected accounting measures in years surrounding the divestment.

^b Years are defined relative to the year of divestment (year 0).

Market Reactions to the Divestment Decision (H2)

Hypothesis 2 consists of two parts: part (a) predicts a positive stock price reaction to the divestment decision,²⁶ and part (b) predicts that a positive reaction is not conditional on expected improvements in subsequent operating performances.

Is There a Positive Market Reaction?

We measure market reaction to the divestment decision by the two-day cumulative abnormal stock return (CAR) covering day -1 and day 0 (the announcement day). Specifically, the cumulative abnormal return for firm k is computed as:²⁷

$$CAR_k = \prod_{s=-1}^0 (1 + R_{ks}) - \prod_{s=-1}^0 (1 + R_{ms}),$$

where R_{ks} is the return on firm k on day s , and R_{ms} is the return on the market portfolio on day s , proxied by the CRSP value-weighted market return.

Table 4 presents descriptive statistics of CAR for the entire sample and for the subsamples of sell-offs and spin-offs. The mean (median) CAR is 2.2 percent (1.3 percent) for the whole sample of 554 segmental divestments, 2.0 percent (1.0 percent) for the subsample of sell-offs, and 3.3 percent (2.4 percent) for spin-offs, all of which are significant at the 0.01 level.²⁸ These results are consistent with part (a) of H2.

Is the Positive Market Reaction Conditional on Expected Improvements in Operating Performance?

Part (b) of H2, that a positive market reaction is not conditional on expected improvements in operating performance, has not been considered in the literature. We discuss evidence for it from both our sample and previous studies.

²⁶ Part (a) of H2 is already established in the literature. We include it here for completeness and to confirm that this result also holds for our sample that is used to test the distinctive hypotheses of our model.

²⁷ The choice of this two-day event window is consistent with prior studies.

²⁸ These results are similar to those of Jain (1985), Klein (1986), and Schipper and Smith (1983).

TABLE 3
Changes in Segment Profitability over Time and Divergence of Profitability between Divested and Continuing Segments

					Test Statistics for Differences in Operating Return in Various Years Relative to Year -1			
Relative Year	Mean	Median	Std. Dev.	n	Mean		Median	
					t	p-value	z	p-value
Panel A: Operating Returns of the Divested Segments in the Years Prior to Divestment								
-5	0.090	0.087	0.130	249	6.04	0.001	5.26	0.001
-4	0.070	0.068	0.141	267	5.20	0.001	4.63	0.001
-3	0.052	0.057	0.155	426	3.92	0.001	3.12	0.001
-2	0.027	0.045	0.192	554	1.71	0.088	1.43	0.150
-1	-0.007	0.037	0.207	554	—	—	—	—
Panel B: Operating Returns of Continuing Segments in the Years Prior to Divestment								
-5	0.100	0.100	0.162	538	1.52	0.120	1.84	0.067
-4	0.107	0.096	0.140	707	2.60	0.009	2.34	0.020
-3	0.107	0.100	0.149	910	2.86	0.004	2.85	0.004
-2	0.097	0.096	0.154	1,127	1.63	0.103	1.50	0.130
-1	0.086	0.088	0.159	1,158	—	—	—	—
Panel C: Divergence of Profitability between the Divested and Continuing Segments in the Years Prior to Divestment								
					Test Statistics for Differences in Profitability Divergence in Various Years Relative to Year -1			
Relative Year	Mean ^a	Median ^a	Std. Dev.	Mean		Median		
				t	p-value	z	p-value	
-5	-0.010	-0.017	0.103	9.96	0.001	4.76	0.001	
-4	-0.037	-0.028	0.115	9.46	0.001	4.45	0.001	
-3	-0.055	-0.043	0.174	6.80	0.001	4.39	0.001	
-2	-0.070	-0.049	0.181	6.13	0.001	3.95	0.001	
-1	-0.093	-0.051	0.229	—	—	—	—	

^a Negative values indicate that the profitability of the divested segment is lower than that of the continuing segments.

For our own sample, we first examine whether there are changes in expectations about future operating performance (proxied by consensus analyst earnings forecasts) before and after the divestment decision. Panel A of Table 5 shows that for the sample as a whole, the changes in forecasts after (versus before) the divestment announcement is small for both current-year earnings and one-year-ahead earnings, and the changes are statistically insignificant. For example, the sample mean of current-year earnings forecast is \$1.195 prior to the divestment decision and \$1.213 after the decision, a mere 1.5 percent increase ($t = 0.52$), and the sample mean of one-year-ahead earnings forecast is \$1.835 prior to the divestment decision and \$1.820 after the decision, a decrease of 0.8 percent ($t = -0.05$).

TABLE 4
Two-Day Abnormal Stock Returns to Divestment Announcements

Types of Divestments	n	CAR ^a					
		Mean	Median	Std. Dev.	% Positive	Minimum	Maximum
All Divestments	554	0.022***	0.013***	0.057	64.3	-0.189	0.374
Sell-offs	455	0.020***	0.010***	0.058	61.8	-0.189	0.374
Spin-offs	99	0.033***	0.024***	0.051	78.0	-0.076	0.235

*** Denotes significance at the 1 percent level for a two-tailed test.

^a CAR is computed as the return of the firm on day -1 and day 0 minus the same two-day return on the CRSP value-weighted market index. t-statistics and Wilcoxon z-statistics are used to test whether the mean and median values of CAR are significantly different from zero.

TABLE 5
Changes in Earnings Forecasts, Risk, and Operating Performances
Before versus After Divestment

Panel A: Analyst Earnings Forecasts Before versus After Divestment (n = 526)

	Forecast of Current Year's Earnings		Forecast of One-Year-Ahead Earnings	
	Mean	Median	Mean	Median
Before Divestment	1.195	1.197	1.835	1.832
After Divestment	1.213	1.219	1.820	1.821
Forecast Revision (After minus Before)	0.018	0.022	-0.015	-0.011
Test of Null Hypothesis (No Change in Forecast)	t = 0.52	z = 0.37	t = -0.05	z = -0.47

Panel B: Systematic Risk (beta) and Total Risk (Return Volatility) Before versus After Divestment (n = 554)^a

	Mean Systematic Risk (beta)	Mean Total Risk (Variance of Daily Return)
Before Divestment	0.723	0.0015
After Divestment	0.680	0.0012
Change in Risk (After minus Before)	-0.043	-0.0003
Test of Null Hypothesis (No Change in Risk)	t = -1.46	F = 1.25

^a Systematic risk (beta) and total risk of a stock are estimated from daily returns in the three-year period before and after divestment.

This shows that stock price increases surrounding the divestment decision are not accompanied by heightened expectations of future operating performances, which is consistent with part (b) of H2 (further evidence is provided from the regression analysis below).

If there is little change in earnings expectations after (versus before) the event, then would positive market reactions be driven by changes in firm risk? To address this question, we examine changes in the systematic market risk (beta) and the total risk (return volatility) of stock after the divestment versus before the divestment. The two risk measures are

estimated from daily returns over a period of three years on each side of the event.²⁹ Panel B of Table 5 shows that for our sample, changes in both beta and total risk are small after (versus before) the divestment decision and are statistically insignificant, suggesting that positive market reactions are not attributed to decreased firm risks.

Finally, we examine how the operating performance of the firm's continuing segments changes after divestment, measured by operating return (operating earnings divided by book value of assets), to gain further insights into potential sources of the market value increase. We perform an analysis both for the overall sample and for a subsample known as non-focus-increasing divestments. It has been reported by Desai and Jain (1999) that non-focus-increasing spin-offs do not result in improved cash flow performances within three years following divestment by either the spun-off or retained divisions, so the positive market reactions to those divestments are particularly puzzling.

Panel A of Table 6 shows that, for the overall sample, there is a slight drop in operating performance by the continuing segments immediately after divestment (year +1), relative

TABLE 6
Operating Returns of Continuing Segments Before and After Divestment

Relative Year	Operating Return	
	Mean	Median
Panel A: Result from the Overall Sample (n = 554)		
-3	0.107	0.100
-2	0.097	0.096
-1	0.086	0.088
0	0.077	0.081
	(t = -0.36)	(z = -1.10)
1	0.085	0.086
	(t = -0.19)	(z = -0.29)
2	0.088	0.094
	(t = 0.14)	(z = 0.87)
3	0.090	0.094
	(t = 0.27)	(z = 0.88)
Panel B: Result from the Subsample of Non-Focus-Increasing Divestments (n = 232)		
-3	0.101	0.095
-2	0.090	0.087
-1	0.089	0.088
0	0.074*	0.078*
	(t = -1.82)	(z = -1.71)
1	0.076*	0.080*
	(t = -1.69)	(z = -1.67)
2	0.084	0.087
	(t = -0.75)	(z = -0.18)
3	0.088	0.093
	(t = -0.15)	(z = 0.65)

* Denotes significance at the 10 percent level for a two-tailed test.

* The t-value (z-value) test whether there is a change in mean (median) operating return in the post-divestment year relative to year -1 (with negative t- or z-values indicating decreases relative to year -1).

²⁹ Our conclusions are unchanged if we use monthly returns instead.

to year -1 , and afterward the performance improves slightly in year $+2$ and year $+3$. However, the difference in operating return between year -1 and any of the three post-divestment years is insignificant, suggesting that improvement in operating performance is not likely a (main) cause of the market value increases.

The result from the subsample of non-focus-increasing divestments (Panel B of Table 6) provides more clear-cut evidence. For this subsample, there is a significantly positive mean abnormal return of 2.04 percent ($t = 5.22$) at the time of the divestment decision (similar to that of the overall sample). However, the profitabilities of continuing segments in the three years following divestment are all below that in year -1 . Furthermore, the drop in profitability in year $+1$ relative to year -1 is significant at the 10 percent level. Thus, for this subsample at least, the market value increases clearly cannot be attributed to the possibility of improved operating performances.³⁰

A similar finding is reported by Desai and Jain (1999) from a sample of non-focus-increasing spin-offs. In searching for reasons for upward market reactions, Desai and Jain (1999) rule out the possibility of high leverage, financial distress, or debt transfer. They finally conclude that non-focus-increasing spin-offs are undertaken by firms to separate out underperforming subsidiaries. However, their explanation is not satisfactory given that firms undertaking such divestments subsequently show no increases in profitability or decreases in risk. Our valuation-based explanation rationalizes the above empirical phenomenon; it shows how market value increases can arise from investors' *re-interpretation* of a given amount of reported aggregate earnings (without increases in expected future earnings or decreases in firm risk). We provide further analysis below to distinguish our explanation from other alternatives.

The Extent of Market Revaluation and the Divergence of Segment Profitability (H3) *Results from the Basic Test*

Hypothesis 3 states that the extent of market revaluation at the time of the divestment announcement increases with the difference in profitability between the divested and continuing segments. To the best of our knowledge, no previous study has predicted or tested this relation. We use the regression technique to test H3.

To apply our model to a cross-sectional setting, we need to adjust for cross-sectional differences in the size of the divested segment relative to that of the whole firm. We use $|q_j - q_i| [A_i / (A_i + A_j)]$ as the adjusted profitability divergence to explain CAR, where A_i and A_j are the asset book values of the divested and continuing segment(s), respectively, and q_i and q_j are the corresponding segment profitabilities.³¹ The following is the basic regression model for testing H3:

$$CAR_k = b_0 + b_1 DIVPROF_k + e_k \quad (10)$$

³⁰ Given that the cause of misvaluation (and divestment) is potential earnings shifting from a low-profitability to a high-profitability segment, our model also predicts that after divesting the low-profitability segment, the *reported* profitability of the firm's continuing segments should *generally* drop (from the pre-divestment level) as the firm can no longer shift earnings across the segments. However, the model also suggests that the magnitude of the drop may or may not be significant. This is because firms that undertake divestments are those that have engaged in relatively little or no manipulation of segment earnings, but the market has overestimated the extent of their segment earnings manipulation and, thus, has undervalued them. The results in Table 6, especially in Panel B (based on a subsample that is less contaminated by alternative motives for divestments), are supportive of this prediction of the model.

³¹ It can be shown that the amount of undervaluation relative to firm value is approximately in proportion to $|q_j - q_i| \times A_i / (A_i + A_j)$.

where $DIVPROF_k \equiv |q_{jk} - q_{ik}|[A_{ik}/(A_{ik} + A_{jk})]$ is the size-adjusted absolute value of the profitability divergence of firm k in the year prior to the divestment, and b_0 and b_1 are coefficients. Our theory predicts $b_1 > 0$. We also extend the basic regression (10) to include several control variables for the reasons discussed below.

Our theoretical model is applicable to different forms of divestment such as sell-offs and spin-offs. It is recognized in the literature that spin-offs have characteristics different from sell-offs and may enjoy benefits not available to sell-offs (e.g., tax benefits and the benefit of having more securities available for trading). To recognize potential differences in market reaction between the two forms of divestment, we add (asset-weighted) dummy variable $SPINOFF$ to Model (10), which equals 1 times $A_i/(A_i + A_j)$ if the form of divestment is a spin-off, and 0 otherwise.

Panel A of Table 7 reports the regression results. When CAR is regressed on $DIVPROF$ alone, we obtain a slope coefficient of 0.179 ($t = 5.59$), significant at the 0.01 level, consistent with H3 that the market reaction to divestment increases with the divergence of reported profitability between the divested and retained segments.

When regressing CAR on both $DIVPROF$ and $SPINOFF$ (Model 10a in the table), we obtain a coefficient of 0.178 on $DIVPROF$ ($t = 5.58$) and 0.061 on $SPINOFF$ ($t = 2.77$), which are both significant at the 0.01 level. The positive coefficient on $SPINOFF$ indicates that spin-offs are associated with additional benefits to shareholders relative to sell-offs, as found previously. More importantly, the coefficient on $DIVPROF$ remains little changed after adding $SPINOFF$, showing that H3 holds for both forms of divestment.

Distinction from Alternative Explanations

We now carry out further tests to distinguish H3 from previous explanations. As mentioned above, Desai and Jain (1999) attribute the gain in market value from divestment to the separation of a poor-performing division from its parent company. One might also argue that poor performance of one of a firm's segments can increase the divergence of profitability among the firm's segments, and the effect of profitability divergence found above could potentially be due to the separating out of a poor-performing segment.³² To demonstrate the distinctiveness of our H3 from this latter conjecture, we include in Regression (10) a control variable, Q_d , which is the profitability of the divested segment weighted by its relative assets within the firm ($A_i/(A_i + A_j)$). The result in Panel A of Table 7 (Model 10b) shows that, controlling for Q_d , the coefficient on $DIVPROF$ remains significant ($t = 3.71$), and at the same time, the coefficient on Q_d is insignificant ($t = -0.041$). This finding is inconsistent with the conjecture that our empirical results for H3 are due to separating out a poor-performing segment from the firm.³³

To reaffirm the distinctiveness of H3, we examine if the effect of profitability divergence is sustained after taking into account possible changes in earnings expectations and risk following divestment. Presumably, if separating out a poor-performing segment were the

³² Theoretically, if the motive for divestment is to separate out a poor-performing segment, then it is not obvious that a positive relation between the market reaction and profitability divergence (similar to H3) will hold in equilibrium. The extent of the market reaction to divestment is (approximately) a product of (1) the expected performance improvement conditional on a divestment taking place (this component should increase as the to-be-divested segment's profitability, q_i , becomes lower) and (2) the probability that a divestment will *not* take place (this component should *decrease* as q_i becomes lower). Given this alternative motive, when q_i is very low, divestment becomes almost a certain event and, thus, there will be little surprise to the market if a divestment indeed takes place; in this case, the market reaction is expected to be small even though the divergence of segment profitability is (likely) large (because of a very low q_i).

³³ As an alternative to Q_d , we also use (asset-weighted) dummy $LOSS$, which equals 1 times $A_i/(A_i + A_j)$ if the divested segment has a negative operating profit, and 0 otherwise. Our conclusion is unchanged.

TABLE 7
Relation between Market Revaluation, Divergence of Segment Profitability, and Firm Complexity

The general version of the regression model is the following:^a

$$CAR_k = b_0 + b_1 DIVPROF_k + b_2 SPINOFF_k + b_3 Q_k + b_4 \Delta EF_{\alpha k} + b_5 \Delta EF_{1k} + b_6 \Delta Beta_k + b_7 FOCUS_k + b_8 ASYNF_k + b_9 M_k + e_k$$

Panel A: Results from the Overall Sample

Variable	Pred. Sign	Model 10 (n = 554)	Model 10a (n = 554)	Model 10b (n = 554)	Model 10c (n = 526)	Model 10d (n = 554)	Model 10e (n = 526)	Model 10f (n = 526)
Intercept	+/-	0.016*** (6.32)	0.014*** (5.16)	0.015*** (5.14)	0.0151*** (5.15)	0.013*** (3.87)	0.011*** (3.32)	0.003 (0.70)
DIVPROF	+	0.179*** (5.59)	0.178*** (5.58)	0.157*** (3.71)	0.1557*** (3.68)	0.153*** (3.62)	0.167*** (3.93)	0.188*** (4.39)
SPINOFF	+		0.061*** (2.77)	0.065*** (2.87)	0.0636*** (2.83)	0.060*** (2.63)	0.056*** (2.49)	0.055*** (2.46)
Q _i	-			-0.041 (-0.76)	-0.045 (-0.83)	-0.045 (-0.83)	-0.033 (-0.61)	-0.020 (-0.35)
ΔEF ₀	+				-0.007 (-0.79)			
ΔEF ₁	+				-0.0004 (-0.04)			
ΔBeta	-				-0.0003 (-0.03)			
FOCUS	+					0.021 (1.37)	0.023 (1.51)	0.023 (1.47)
ASYNF	+						0.014** (2.29)	0.015** (2.41)
M	+							0.0005*** (2.78)
Adjusted R ²		0.054	0.065	0.065	0.061	0.067	0.074	0.086

(continued on next page)

TABLE 7 (Continued)

Panel B: Results for the Pre- and Post-SFAS No. 131 Subperiods

Variable	Pred. Sign	Pre-SFAS No. 131 (n = 424)	Post-SFAS No. 131 (n = 102)
Intercept	+/-	0.0061 (1.38)	-0.0046 (-0.25)
<i>DIVPROF</i>	+	0.1392*** (2.67)	0.2409** (2.65)
<i>SPINOFF</i>	+	0.0550** (2.41)	0.0512 (1.58)
<i>Qi</i>	-	-0.0589 (-0.96)	-0.0100 (-0.09)
<i>FOCUS</i>	+	0.0208 (1.37)	0.0580 (0.89)
<i>ASYINF</i>	+	0.0126** (2.43)	0.0240 (1.26)
<i>M</i>	+	0.0004** (1.99)	0.0007* (1.60)
Adjusted R ²		0.065	0.081

***, **, * Denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

* CAR_k is the cumulative abnormal return from day -1 to day 0 for firm k ; $DIVPROF_k = |q_{ik} - q_{id}| \frac{A_{ik}}{A_{ik} + A_{id}}$ is the asset-weighted profitability divergence between the divested segment (i) and continuing segments (j) of firm k , with q_{ik} and q_{id} being their respective operating returns, and B_{ik} and B_{id} being their respective asset book values; $SPINOFF_k$ is an asset-weighted dummy variable, equal to 1 times $A_i/(A_i + A_j)$ if the method of divestment is spin-off, and 0 otherwise; Q_{ik} is the operating profitability of the divested segment of firm k , weighted by relative assets of the divested segment $A_i/(A_i + A_j)$; ΔEF_{ik} is the change in consensus forecast of firm k 's current-year earnings after divestment versus before divestment, scaled by the absolute value of mean forecast; ΔEF_{ik} is the change in consensus forecast of firm k 's year-ahead earnings after divestment versus before divestment, scaled by the absolute value of mean forecast; ΔBet_{ik} is the change in systematic risk of firm k after divestment versus before divestment; $FOCUS_k$ is an asset-weighted dummy variable, equal to 1 times $A_i/(A_i + A_j)$ if the divested segment is not in the two-digit SIC industry of the parent firm, and 0 otherwise; $ASYINF_k$ is information asymmetry prior to divestment, proxied by the standard deviation of analyst earnings forecasts in the month prior to the divestiture announcement, scaled by the absolute value of mean forecast; and M_k is the square of the number of segments of firm k before divestment, as a proxy for the complexity of firm structure.

true cause, then the market reaction would be driven by changes in earnings expectations and risks, as opposed to profitability divergence per se. We include three additional control variables, change in current-year earnings forecast (ΔEF_0), change in year-ahead earnings forecast (ΔEF_1), and change in systematic risk ($\Delta Beta$). Panel A of Table 7 shows that the coefficient on *DIVPROF* remains significant ($t = 3.68$) and all three control variables have little impact on stock price reactions, which is consistent with our valuation-based explanation.

As an additional test, we partition the sample into two groups. In one group, the divested segment shows a deterioration in profitability from year -2 to year -1 (342 observations), and in the other group, the divested segment actually shows an improvement in profitability from year -2 to year -1 (212 observations). The possible motive to separate out a poor-performing segment would apply mainly to the former group rather than the latter. The result (not tabulated) shows that market reactions are positively related to the profitability divergence in both groups, regardless of whether the performance of the divested segment was improving or declining prior to the divestment, which confirms the distinctive role of profitability divergence as stated in H3.

Together, the above results indicate that our valuation-based explanation for divestment is distinct from the motive of separating out a poor-performing segment, and that divergence of segment profitability plays a unique role in explaining the market revaluation surrounding the divestment decision. In fact, our results suggest that merely separating out an unprofitable segment per se is not a significant factor for explaining positive market reactions.

Another control variable we add is dummy *FOCUS* (asset-weighted), which equals 1 times $A_i/(A_i + A_j)$ if the divested segment is not within the two-digit SIC industry of the firm, and 0 otherwise. The result in Table 7, Panel A (Model 10d) shows that the coefficient on *DIVPROF* remains significant after controlling for *FOCUS*, suggesting that the effect captured by H3 is separate from that of increased business focus. The coefficient on *FOCUS* is positive but not significant at the 0.1 level ($t = 1.37$).

Krishnaswami and Subramaniam (1999) relate market misvaluation to the general notion of information asymmetry, and find that market reaction is positively related to the degree of information asymmetry as proxied by the dispersion of analyst forecasts of the firm's annual earnings. To examine whether our predicted effect of profitability divergence is distinct from that of the information asymmetry variable examined previously, we add variable *ASYINF*—defined as the standard deviation of analyst earnings forecasts (scaled by the absolute value of mean earnings forecast) for the divesting firm in the month prior to the divestment announcement—to proxy for information asymmetry. The result in Panel A of Table 7 (Model 10e) shows that the coefficient on *ASYINF* is positive and significant at the 0.05 level ($t = 2.29$), consistent with previous findings. More importantly, the coefficient on *DIVPROF* continues to be significant, indicating that the role of profitability divergence in explaining market revaluation is not made redundant by that of the information asymmetry variable considered before.

It is interesting to observe from Panel A of Table 7 that, as we add more and more control variables to the basic regression (Model 10 through Model 10e), our main explanatory variable *DIVPROF* remains statistically significant, the significance of the intercept term diminishes, and the adjusted R^2 increases. Together, these results suggest that our valuation-based explanation complements some of the alternative motives for divestments as considered in the extant literature.

In sum, our empirical results are consistent with H3, which states that the market reaction to divestment increases with the divergence of profitability between the divested and continuing segments of the divesting firm and, empirically, the role of profitability

divergence in explaining market revaluation is not made redundant by alternative explanations.

Firm Complexity and Market Reaction to Divestment (H4)

Hypothesis 4 predicts that the market reaction to divestment is greater for firms that have a more complex structure. We use two measures of firm complexity (in the spirit of the model) to test H4. One measure is the square of the number of segments within a firm (denoted as M). Our rationale is that when there are more segments combined into a firm, its structure becomes more complex at an increasing rate, which makes it more difficult for investors to trace earnings to individual segments.

The second measure of firm complexity is $ASYINF$ (dispersion of analyst forecasts), as discussed above. This variable reflects outside investors' uncertainty about a firm's operations. We hypothesize that the more complex is the firm, the less certain is the market about the firm, and thus $ASYINF$ can proxy for firm complexity in this context.

Panel A of Table 7 (Model 10f) shows that the coefficient on M is positive and significant at the 0.01 level, the coefficient on $ASYINF$ is positive and significant at the 0.05 level, and that these effects are incremental to the other explanatory variables already included. Thus, the results are consistent with H4, which states that market revaluation at the time of the divestment decision is greater for more complex firms.

Finally, to check the robustness of our results before SFAS No. 131 (1990–1997) and after SFAS No. 131 (1998–2001), we perform separate analyses with Model (10f) for the two subperiods. After adopting SFAS No. 131, firms have less latitude in defining segments, but more latitude in defining the profit of a segment. *A priori*, it is not clear whether the valuation-based motive for divestment should be more important or less important after SFAS No. 131. Panel B of Table 7 shows that results from both time periods are consistent with our hypotheses, with the key explanatory factors $DIVPROF$, $ASYINF$, and M being generally significant. However, the results are more strongly demonstrated in the pre-SFAS No. 131 period than in the post-SFAS No. 131 period. This implies that SFAS No. 131 may have been useful in reducing the extent of cross-segment earnings manipulation and improving the quality of segment reporting, so the misvaluation problem may have become less severe in the post-SFAS No. 131 period. The decline in divestment sample sizes in the post-SFAS No. 131 period, as shown in Table 1, also suggests an alleviation of information asymmetry under the new standard.

SUMMARY AND CONCLUDING REMARKS

This paper provides theory and evidence to explain how corporate divestment can be motivated by a firm's desire to provide more credible information about segment-level operating performances. We develop a real-options-based valuation model that links firm value to segment accounting data. We then show that due to the convexity of the valuation function, earnings from different segments of a firm have different valuation implications, and this creates firms' incentives in external financial reporting to shift earnings from one segment to another in order to increase market valuation. Distorted reporting clouds the information conveyed by accounting data and causes market values to deviate from intrinsic values. Divestment arises as a voluntary commitment by undervalued firms that aims to improve reporting quality and to correct misvaluation.

The theoretical model yields the following predictions: (1) at the time of divestment, the firm experiences a greater divergence of profitability between the divested and continuing segments than in the preceding years; (2) the stock price reacts positively to the

divestment decision, and the upward revaluation is not conditional on expected improvements in future operating performances; (3) the magnitude of market revaluation increases with the extent of profitability divergence between the divested and continuing segments; and (4) the market reaction is stronger for firms that have a more complex structure, which makes it more difficult for investors to correctly interpret reported data. Our empirical results are consistent with these predictions. The results also indicate that our valuation-based explanation for divestment is distinct from other explanations proposed in prior studies.

The study contributes to our understanding of the causes and consequences of divestment from a valuation perspective (as opposed to an operating efficiency/cash flow perspective). It introduces an explicit role of accounting data in characterizing the circumstances under which divestment takes place and in explaining the magnitude of market revaluation. The study points to the limitations of financial reporting in informing investors of a firm's underlying economic conditions and suggests that divestment can serve as a (costly) device to enhance corporate communications with the capital market in situations in which segment reporting fails to convey information effectively.

REFERENCES

- Amram, M., and N. Kulatilaka. 2000. Strategy and shareholder value creation: The real option frontier. *Journal of Applied Corporate Finance* 13: 15–28.
- Aron, D. 1991. Using the capital market as a monitor: Corporate spin-offs in an agency framework. *RAND Journal of Economics* 22: 505–518.
- Berger, P., and E. Ofek. 1995. Diversification's effect on firm value. *Journal of Financial Economics* 37: 39–65.
- Biddle, G., P. Chen, and G. Zhang. 2001. When capital follows profitability: Non-linear residual income dynamics. *Review of Accounting Studies* 6: 229–265.
- Burgstahler, D., and I. Dichev. 1997. Earning, adaptation, and equity value. *The Accounting Review* 72: 187–215.
- Chen, P., and G. Zhang. 2003. Heterogeneous investment opportunities in multiple-segment firms and the incremental value relevance of segment accounting data. *The Accounting Review* 78: 397–428.
- Daley, L., V. Mehrotra, and R. Sivakumar. 1997. Corporate focus and value creation: Evidence from spin-offs. *Journal of Financial Economics* 45: 257–281.
- Damodaran, A. 2000. The promise of real options. *Journal of Applied Corporate Finance* 13: 29–43.
- Desai, H., and P. Jain. 1999. Firm performance and focus: Long-run stock market performance following spinoffs. *Journal of Financial Economics* 54: 75–101.
- Feltham, G., and J. Ohlson. 1996. Uncertainty resolution and theory of depreciation measurement. *Journal of Accounting Research* 34: 209–234.
- Gilson, S., P. Healy, C. Noe, and K. Palepu. 2001. Analyst specialization and conglomerate stock breakups. *Journal of Accounting Research* 39: 565–582.
- Jain, P. 1985. The effect of voluntary sell-off announcements on shareholder wealth. *Journal of Finance* 40: 209–224.
- John, K., and E. Ofek. 1985. Asset sales and increase in focus. *Journal of Financial Economics* 37: 105–126.
- Klein, A. 1986. The timing and substance of divestiture announcements: Individual, simultaneous and cumulative effects. *Journal of Finance* 41: 685–697.
- Krishnaswami, S., and V. Subramaniam. 1999. Information asymmetry, valuation, and the corporate spin-off decision. *Journal of Financial Economics* 53: 73–112.
- Linn, S., and M. Rozeff. 1984. The corporate sell-offs. *Midland Corporate Finance Journal* 6: 428–436.

- Miles, J., and J. Rosenfeld. 1983. The effect of voluntary spin-off announcements on shareholder wealth. *Journal of Finance* 38: 1597–1606.
- Myers, S. 1977. Determinants of corporate borrowing. *Journal of Financial Economics* 5: 147–175.
- , and N. Majluf. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13: 187–221.
- Nanda, V., and M. Narayanan. 1997. Disentangling value: Misvaluation and the scope of the firm. Working paper, University of Michigan.
- Ravenscraft, D., and F. Scherer. 1987. *Mergers, Sell-offs, and Economic Efficiency*. Washington, D.C. Brookings Institution.
- Schipper, K., and A. Smith. 1983. Effects of recontracting on shareholder wealth: The case of voluntary spin-offs. *Journal of Financial Economics* 12: 153–186.
- , and ———. 1984. The corporate spin-off phenomenon. *Midland Corporate Finance Journal* 6: 437–443.
- Weisbach, M. 1995. CEO turnover and the firm's investment decisions. *Journal of Financial Economics* 37: 159–188.
- Zhang, G. 2000. Accounting information, capital investment decision, and equity valuation: Theory and empirical implications. *Journal of Accounting Research* 38: 271–295.

Earnings Management and Ownership Retention for Initial Public Offering Firms: Theory and Evidence

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ABSTRACT: This paper investigates, both theoretically and empirically, how earnings management and ownership retention interact, and how these two jointly affect the equilibrium market valuation of IPO firms in the presence of information asymmetry. Analytically, this paper extends the univariate signaling framework of Leland and Pyle (1977) and derives an *efficient* signaling equilibrium in which both reported earnings and ownership retention are endogenously chosen to convey the IPO issuer's private information. It is shown that even though either ownership retention or reported earnings communicates the issuer's type to the market unambiguously, the issuer will strategically employ both signals to achieve separation from potential lower quality imitators at minimal cost. Comparative statics analysis shows that the trade-off between the two signals depends critically on the uncertainty over future earnings. The theoretical analysis generates several empirical implications regarding market efficiency, IPO pricing, and the strategic choice of earnings management. Through systematic econometric analysis, I confirm the major predictions of the model.

Keywords: *IPO; earnings management; information asymmetry; discretionary accruals.*

Data Availability: *The data used in this study are publicly available from the sources described in the text.*

I. INTRODUCTION

This paper examines, both theoretically and empirically, how earnings management and ownership retention interact, and how these two jointly affect the equilibrium valuation of IPO firms when there is information asymmetry between the IPO issuer and perfectly rational investors. By earnings management, I refer to firms' inflating reported earnings by (1) the use of the flexibility allowed in the Generally Accepted Accounting Principles (GAAP) to change reported earnings without changing the underlying cash flows,

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which could be labeled as *misreporting*, and/or (2) constructing economic events to change the underlying cash flows itself, which could be labeled as *real earnings management*.¹

I first show that income-increasing earnings management can prevail as the outcome of a fully separating signaling equilibrium when an IPO issuer wants to overstate earnings to a certain level to deter a lower type from mimicking his earnings report. To the extent that earnings management is value-detrimental to the firm, the amount of earnings management necessary to achieve differentiation decreases with the level of ownership retained by the IPO issuer. I then extend Leland and Pyle's (1977) (hereafter, LP) univariate signaling model in which ownership retention is an effective signal of firm value and derive an *efficient* signaling equilibrium in an IPO setting in which both reported earnings and ownership retention are chosen as signaling devices. As IPO issuers can signal through both ownership retention and reported earnings, the efficient mix must minimize total signaling costs. I show that, in equilibrium, many firms both over-report earnings and deviate from the first-best level of retained ownership. Comparative statics analysis also shows that the trade-off between earnings management and ownership retention depends critically on the uncertainty over future earnings.

Prior empirical work examining earnings management behavior in the new issues market has generally focused on the notion that managers opportunistically overstate earnings to issue stocks at artificially inflated prices. As an explanation of the long-run underperformance of IPO firms, Teoh, Welch, and Wong (1998) (hereafter, TWW) and Teoh, Wong, and Rao (1998) (hereafter, TWR) document that there is a negative correlation between issuing period abnormal accruals and post-issue abnormal stock returns of IPO firms, suggesting that investors are misled by earnings management before equity offerings and are then disappointed as expectation errors are corrected over time. In contrast to the above "managerial opportunism" hypothesis, I model earnings management as consequence of the actions of rational agents with asymmetric information, implying that, in equilibrium, investors rationally anticipate some amount of earnings management and should not be systematically fooled by the exaggerated earnings reports. Thus, on the empirical side, I first reexamine the robustness of the results in TWW and TWR. Using discretionary accruals estimated from cash flow statements and adjusted for a performance-matched firm's discretionary accruals as suggested by Kothari et al. (2005), I find that discretionary accruals, with or without performance matching, are the highest in the IPO year and have strong predictive power for IPO firms' subsequent decline in operating performance. However, in my sample period, there is no strong evidence that discretionary accruals estimated from cash flow statements and post-issue abnormal stock returns are negatively correlated. Performance matching further weakens the statistical and economic significance of the relationship between the two. Taken together, the results are consistent with IPO issuers advancing accruals to increase reported earnings in the issuing year, but are inconsistent with investors being systematically fooled by such window-dressing behavior. I then directly test the valuation implications of my signaling model and find that both reported earnings and ownership retention are strongly positively priced signals in valuing an IPO firm. Finally, employing a simultaneous equation framework to examine the joint determination of an IPO firm's earnings management and ownership retention decisions, I find evidence that,

¹ The most obvious examples of misreporting include adjusting reserves for losses such as not marking down "stale" inventory or bad debt. As total reported earnings must equal total cash flows over the firm's life cycle, such behavior would simply relocate an amount from one period to another. However, real earnings management through changing the firm's operations (for example, by delaying desirable investment or cutting prices to boost sales) has real consequences, and can impose significant economic costs beyond earnings reversal.

controlling for other factors, riskier IPO firms resort more to income-increasing earnings management and retain less ownership, confirming the comparative statics prediction of the model.

An initial public offering (IPO) is the first opportunity for a firm's founders and initial investors to realize the value of their ownership stake in a firm. The IPO process in the U.S. is governed by the Securities Act of 1933. A firm that decides to float a new issue hires an underwriter who performs a due-diligence investigation of the firm and then prepares an offering prospectus that presents externally audited financial statements for the most recent three years, along with information about the firm, its business, future prospects, competitors, and products. The prospectus is used as a marketing document by the underwriter in roadshows to solicit demand, in particular from institutional investors.

There is no doubt that IPOs are often associated with high information asymmetries between insiders (entrepreneurs, management, etc.) and outside investors. Inside knowledge concerning investment opportunities, managerial skills, and the ability to control future agency costs, among other things, are often the private information of management. This is a typical adverse selection problem and in the absence of a mechanism or institution that will overcome the information asymmetry, the market would fail.

LP propose a solution to this problem through a univariate signaling model with ownership retention. They argue that when making an initial public offering, the risk-averse owner of a private firm could send a signal to the market about the value of the firm by retaining part of its equity (and thus its risk). The model yields a separating equilibrium where the owners of the firms of each possible value optimally retain a specific portion of their firm's shares and investors correctly infer firm value from each firm's signal.

This paper extends LP's framework to include reported earnings as a second signal of firm value for the following reasons:

- First, when valuing an IPO firm, investors would rely heavily on financial statements for valuation, relative to established firms with alternative sources of information. Underwriters often set the offer price using the price-earnings multiple of a publicly traded firm in the same industry as the prospective IPO. Thus, the IPO issuer has a strong incentive to report favorable accounting information in the prospectus to influence investors' perception of the firm's value.
- Second, IPO issuers have considerable discretion in reporting earnings. Even though the accounting reports in the offering prospectuses are required to be audited by external auditors to verify compliance with GAAP, the accrual accounting system permits considerable discretion in recognizing the timing and amounts of revenues and expenses. It is also hard for investors to judge the appropriateness of the reported accounting numbers due to the lack of other sources of corroborative information. Further, current accounting regulation (APB No. 20) allows IPO firms to change their accounting choices via retroactive restatement for all the financial statements presented in the offerings prospectus. Thus, during the IPO process, the issuer has exceptional opportunity to boost reported earnings.
- Third, and perhaps most important, income-increasing earnings management is arguably costly to the firm. Even though the manager might inflate reported earnings in a single period, over the firm's life cycle, total reported earnings must equal total cash flows. Thus, as accounting accruals eventually reverse, future earnings suffer from past manipulation, potentially triggering litigation and increases in the cost of capital. Further, some earnings management techniques have real economic costs, such as poor timing of sales and early liquidation of assets that are not "mature"

for liquidation yet. All these costs are likely to increase with the magnitude of earnings manipulation. In this paper, I argue that the existence of such costs prevents earnings from being inflated to the point of uninformativeness. Due to information asymmetry surrounding an IPO, a low-quality firm has a natural tendency to overstate earnings so that it can be pooled with high-quality firms. Thus, to achieve separation, high-quality firms have an incentive to overstate earnings to a level that is prohibitively costly for a lower type to mimic. In equilibrium, rational investors realize that only a high-value firm could bear the cost of overstating earnings to such a high level and value the firm accordingly. In this sense, positive earnings management can be viewed as a signaling device to achieve separation.

An important question in any signaling model is whether the signal being examined would still be used if the firm had a portfolio of signals available. Most signaling models examine in isolation a somewhat arbitrary action by corporate insiders, showing that it has the required cost structure as in Spence (1973) or Riley (1975) for the existence of an information equilibrium. However, there seems to be little or no reason why firms would not use a mix of variables to signal firm value. Milgrom and Roberts (1986) are the first to study such a scenario in which a monopolist chooses advertising and price to signal his product quality at least cost. Engers (1987) argues that when multiple signals are used, the directional impacts of individual signals might be intertwined and the mix of signaling efforts will depend upon the relative power and costs of various signals available.² This study seeks to investigate how an IPO issuer can communicate private information to prospective investors at minimal cost by combining earnings management and ownership retention. It takes into account the interaction between the two signals and also addresses the efficiency of the two signals used. Characterization and comparative statics analysis of the resulting *Pareto-dominant* or *efficient* signaling equilibrium forms the basis of several empirical predictions.

Several papers have extended the basic framework of LP to examine other phenomena observed around initial public offerings. Hughes (1986) and Grinblatt and Hwang (1989) study the problem of IPO issuers trying to signal to investors both the mean and variance of the firm's future cash flows. Another signal, in addition to ownership retention, is needed to effectively communicate these two pieces of information. Hughes (1986) constructs a separating equilibrium in which an IPO issuer uses direct disclosure to disclose the expected value of the firm and uses ownership retention to signal the costs of such disclosure. In Grinblatt and Hwang (1989), the two signals are ownership retention and underpricing.³ Datar et al. (1991) examine how the choice of auditor can be used together with ownership retention to communicate the issuer's private information to the market. The authors show that there exists a unique, stable separating equilibrium where each type of entrepreneur first separates himself from some of the other types by the quality of the auditor hired and the resulting audited report, and then from the remaining types through ownership retention.

This paper investigates features of the IPO issuer's cost-minimizing signaling portfolio, which involves combining earnings management and ownership retention. An interesting

² For other papers that study an efficient signaling equilibrium with multiple signals, see John and Mishra (1990) and Viswanathan (1987).

³ Grinblatt and Hwang (1989) also assume that the firm makes a second, seasoned offering soon after the IPO, with some possibility that the firm's type is exogenously revealed between the initial and seasoned offerings.

conclusion is that the high-type issuer actually *values* income-increasing earnings management as a signaling device, in addition to ownership retention.⁴ Further, the model's simple yet intuitive framework permits derivation of several empirical implications regarding market efficiency, IPO pricing, and the strategic choice of earnings management, all of which can be easily taken to the data and tested on observable variables.⁵ Through systematic econometric analysis, I confirm the major predictions of the model.

The remainder of the paper is organized as follows. Section II describes the setting of the model and its underlying assumptions. Section III discusses various signaling devices. Section IV develops the full model. Section V develops empirical hypotheses and discusses key empirical proxies. Section VI to Section VIII carry out empirical tests for each hypothesis. Section IX summarizes the paper.

II. MODEL DESCRIPTION

Consider a world with two-periods, period 0 and period 1, in which an IPO issuer takes a firm public by selling equity to a large group of investors at the end of period 0. The firm liquidates sometime after period 1 when all cash flows materialize. Without loss of generality, all variables are scaled so that the interest rate is 0. Earnings in each period are generated from that period's operations. Assume that in the absence of any manipulation, the period "true" earnings, e_0 , are the best predictor of period 1 "true" earnings, e_1 , and thus of the firm's liquidating dividends. In particular, assume that the firm's "true" earnings follow a random walk $\tilde{e}_1 = e_0 + \tilde{\mu}$, with $\tilde{\mu} \sim N(0, \sigma^2)$.

Investors hold well-diversified portfolios and are risk-neutral with respect to firm-specific risk, so they care only about the expected value of the liquidating dividends. Let $\theta = e_0 + E[\tilde{e}_1|e_0] = 2e_0$ denote the intrinsic value of the firm to investors, also termed as firm type. It immediately follows that e_0 can be written as $e_0 = \frac{\theta}{2}$, which is an increasing function of θ . In other words, a firm with higher intrinsic value to investors must, in expectation, have the potential to generate a higher stream of earnings. There are two issuer types: a high-type issuer θ^H , with "true" period 0 earnings $e^H = \frac{\theta^H}{2}$, and a low-type issuer θ^L with "true" period 0 earnings $e^L = \frac{\theta^L}{2}$, with $\theta^H > \theta^L$ and thus $e^H > e^L$. The issuer has negative exponential utility with a coefficient of absolute risk aversion b . He is averse to firm-specific risk and prefers to divest his equity holdings in the firm completely.

At the beginning of period 0, the issuer gets private information about e_0 (and thus about θ) and reports current earnings as r in the prospectus. The reported earnings r need not equal the "true" earnings. The difference $m = r - e_0$ is the amount of earnings inflation (or deflation, if m is negative), which transfers income from one period to another in a way that is not observed by investors. As argued before, such earnings manipulation is detrimental to value of the firm. Now let $m = r - e_0 = r - \frac{\theta}{2}$ denote the amount of earnings management and let $C(m)$ be the cost to the firm of such manipulation. I make the following assumptions regarding the functional form of C , which is common knowledge to all market participants:

⁴ This is in contrast with the signal-jamming explanation of earnings management where the firm is "trapped" into inflating earnings simply because the market expects it to do so (Stein 1989; Shivakumar 2000).

⁵ In contrast, Hughes (1986) makes strong assumptions about preferences and costs so that an explicit solution can be obtained, making it hard to test the pricing implications of his model.

- $C(m) > 0$ when $m > 0$, and $C(m) = 0$ otherwise.
- $\forall m > 0$, $C' > 0$, $C'' > 0$, $C''' \geq 0$, and $C'(0) = 0$.⁶

Information asymmetry plays an important role at the end of period 0 when the issuer announces the current accounting profit as r and offers a proportion $(1 - \alpha)$ of the firm to the public. The issuer seeks to maximize his expected utility given his private information about θ . Risk-neutral investors know σ^2 and all other relevant parameters and will purchase the offering if and only if they infer that the expected value is at least as high as the price. The equilibrium market price P is a function of observable actions, in particular, ownership retention α and the reported earnings r (and all parameters of common knowledge). Further, let $V(r; \theta)$ denote the value of the firm when the intrinsic value of the firm is θ and the reported earnings are r , then $V(r; \theta) = \theta - C\left(r - \frac{\theta}{2}\right)$.

The issuer wants to maximize the expected end-of-period utility, $-e^{-b\bar{W}}$, where $\bar{W}$ denotes his random end-of-period wealth with mean $\bar{W}$ and variance σ_w^2 . Given the assumptions of normality and negative exponential utility, the issuer's objective function $\max_{\alpha, r} \{E[-e^{-b\bar{W}}]\}$ simplifies to the maximization of the mean-variance expression:

$$\max_{\alpha, r} \left\{ \bar{W} - \frac{b}{2} \sigma_w^2 \right\}. \quad (1)$$

Since $\bar{W} = \alpha V(r; \theta) + (1 - \alpha)P(\alpha, r)$ and $\sigma_w^2 = \alpha^2 \sigma^2$, the objective function becomes:⁷

$$\max_{\alpha, r} \left\{ \alpha V(r; \theta) + (1 - \alpha)P(\alpha, r) - \frac{b}{2} \alpha^2 \sigma^2 \right\}. \quad (2)$$

Let $U(\alpha, r, P(\alpha, r); \theta) = \alpha V(r; \theta) + (1 - \alpha)P(\alpha, r) - \frac{b}{2} \alpha^2 \sigma^2$. The problem faced by the issuer is thus to choose α and r to maximize $U(\alpha, r, P(\alpha, r); \theta)$, given his conjecture of the equilibrium pricing function $P(\alpha, r)$ and his type θ .

Before characterizing the solution to the issuer's problem under asymmetric information, it is useful to note the solution under full information (i.e., in the case where investors observe firm type at time 0). When there is no information asymmetry, there is no need for the manager to signal through ownership retention or manipulation of earnings. Hence, the risk-averse issuer would truthfully report earnings and retain no share of the firm, i.e., the first best choice for the issuer would be $\alpha^{FB} = 0$ and $r^{FB} = e_0 = \frac{\theta}{2}$.

III. ANALYSIS OF UNIVARIATE SIGNALING

Signaling through Ownership Retention Only

Suppose that the value of the firm is signaled solely through the level of ownership retention. The maximization problem faced by the issuer is:

⁶ C is increasing and convex in m because cheap manipulation is undertaken first. The assumption about the third derivative of C is needed only to get the sharp comparative statics result in Proposition 4.

⁷ To simplify the analysis, I assume that there is no market-wide risk. If market-wide risk exists, then the entrepreneur would hold a portfolio that compensates for any firm-specific risk borne as a result of the ownership retention by underweighting (overweighting) stocks that are positively (negatively) correlated with the firm. As shown in LP, where such is the setting, none of the conclusions about α would change.

$$\max_{\alpha \geq 0} U(\alpha, P(\alpha); \theta) \Leftrightarrow \max_{\alpha \geq 0} \left\{ \alpha\theta + (1 - \alpha)P(\alpha) - \frac{b}{2} \alpha^2 \sigma^2 \right\}. \quad (3)$$

In a separating equilibrium the high-type issuer θ^H must separate himself from the low-type issuer θ^L by retaining a sufficiently large fraction of the firm's equity. Because the expected liquidating dividends of θ^L are smaller than that of θ^H , mimicking θ^H by retaining the same fraction of equity will be too costly for θ^L . Let α^H and α^L denote the ownership retention strategies for θ^H and θ^L , respectively. Then the following proposition is just a reiteration of the LP result framed in the current setting:

Proposition 1: In the separating equilibrium where the firm value is signaled only through ownership retention, $\alpha^L = 0$ and α^H is given by:

$$\alpha^H = \frac{\sqrt{(\theta^H - \theta^L)(\theta^H - \theta^L + 2b\sigma^2)} - \theta^H + \theta^L}{b\sigma^2}. \quad (4)$$

Proof. See Appendix.

Signaling through Reported Earnings Only

Here, I examine another special case: the issuer's fractional holdings are fixed at α and so the firm value to outside investors is solely conveyed by reported earnings. Let r^H and r^L denote the reporting strategies for θ^H and θ^L , respectively. If the high-type firm does not manipulate reported earnings, r^H would coincide with the *true* earnings e^H . In this case, θ^L would have an incentive to overstate earnings if the benefit of being valued as θ^H exceeds the cost of doing so.

For θ^L , the benefit of overstating earnings is the increase in cash receipts for being valued as θ^H instead of θ^L for the $(1 - \alpha)$ share of the firm sold. The cost of over-reporting is that for the α share of the firm under his ownership, the value of the firm would decrease by the cost of such over-reporting behavior. Hence, θ^L would want to pretend to be θ^H if $\alpha C(e^H - e^L) < (1 - \alpha)(\theta^H - \theta^L)$, or, equivalently, if $C(e^H - e^L) < \frac{1 - \alpha}{\alpha} (\theta^H - \theta^L)$. Let α^* be such that $C(e^H - e^L) = \frac{1 - \alpha^*}{\alpha^*} (\theta^H - \theta^L)$. Then for $\alpha < \alpha^*$, truthful reporting cannot be an equilibrium.

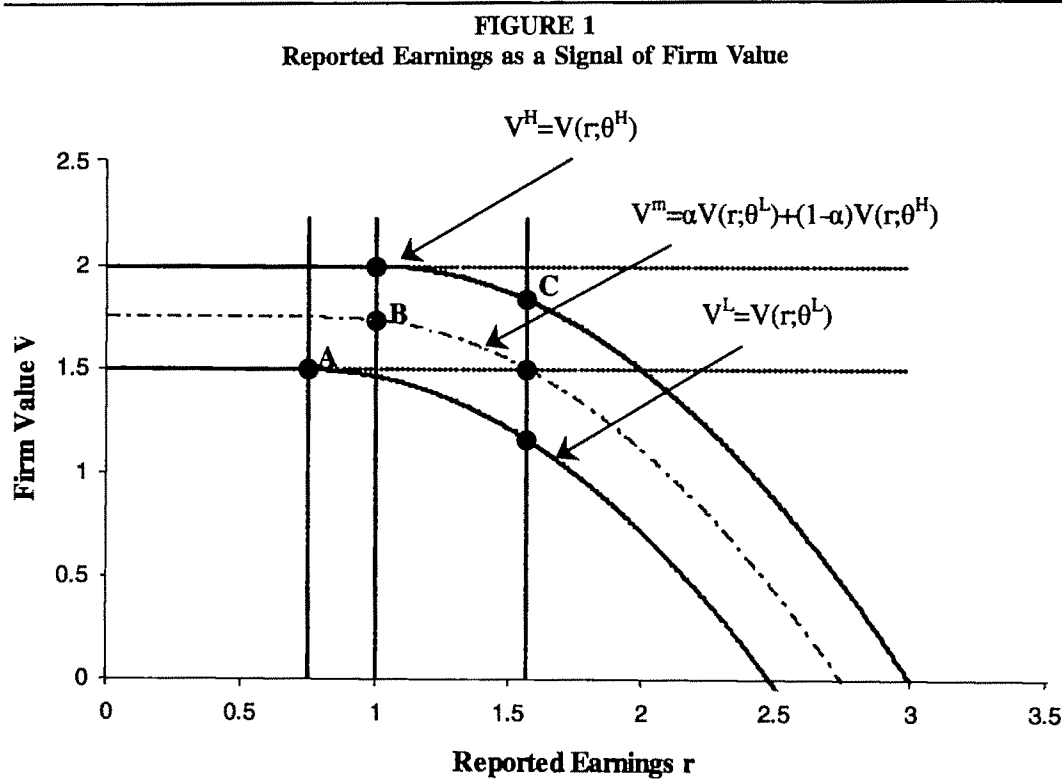
How would θ^H differentiate himself from θ^L when $\alpha < \alpha^*$ and the market valuation depends only on reported earnings? The high-type could overstate earnings to a level that is prohibitively costly for the low-type to mimic. In such an equilibrium, investors perceive a certain level of $r^H > e^H$ to be from the high-type issuer, and this system of beliefs must be self-fulfilling, i.e., the low-type issuer would truthfully report $r^L = e^L$, the high-type issuer would report $r^H > e^H$, and upon observing reported earnings of r^H , the market knows that this is from θ^H and would pay the price $\theta^H - C(r^H - e^H)$. I use $r^H(\alpha)$ to denote the separating r^H as a function of α , so that for the low-type, the cost of reporting r^H is just as high as the benefit of being valued as a high-type. It is shown in the proof of the following proposition that such $r^H(\alpha)$ is decreasing in α and is greater than e^H . Further, such separating equilibrium satisfies Cho and Kreps (1987) intuitive criterion for stability:

Proposition 2: For exogenously fixed α , with α^* and $r^H(\alpha)$ defined above, and with $C'' > 0$:

- 1) When $\alpha = 0$, the earnings report ceases to be informative and no equilibrium exists because the IPO issuer bears no cost associated with over-reporting earnings.
- 2) When $\alpha \geq \alpha^*$, truthful reporting constitutes an equilibrium.
- 3) When $0 < \alpha < \alpha^*$, there exists a fully separating equilibrium in which θ^H reports $r^H(\alpha) > e^H$, and θ^L reports $r^L = e^L$.
- 4) There is no pooling equilibria satisfying the Cho-Kreps Intuitive Criterion.

Proof. See Appendix.

The intuition of the proposition can be best illustrated by Figure 1. In the figure, the dashed curve V^m depicts the “mimicking” utility for θ^L if θ^L could trick the market into believing that it is θ^H by overstating earnings to r^H . When the high-type truthfully reports



The case illustrated is for the following values of the model parameters: α , ownership retention, is 0.5; e^L , the true earnings of the low-type firm, is 0.75; e^H , the true earnings of the high-type firm, is 1; the cost of earnings management $c(r, \theta)$ is equal to $\frac{1}{2}(r - (\theta/2))^2$ when $r > e = (\theta/2)$ and 0 otherwise; the firm value V as a function of reported earnings and the firm type equals $(\theta - c(r, \theta))$. The dashed curve V^m depicts the “mimicking” utility for θ^L : if θ^L could trick the market into believing that it is θ^H by overstating earnings to r^H . V^m is a weighted average of V^H and V^L , i.e., $\alpha V^L + (1 - \alpha)V^H$. When the high-type truthfully reports earnings as $r = e^H = 1$, the mimicking utility of the low-type is 1.73 (point B), greater than its full information value of 1.5 (point A). Only by reporting earnings of 1.57 (point C) can the high-type effectively deter the low-type from mimicking its earnings report, because now the mimicking utility for the low-type is equal to its true value under symmetric information.

earnings, the mimicking utility of the low-type at point B is greater than its full-information value at point A. Only by over-reporting earnings to point C can the high-type effectively deter the low-type from mimicking its earnings report, because now the mimicking utility for the low-type is equal to its true value under symmetric information.

Some features of the above signaling model are worthy of further discussion. First, notice that the observable signal here is the level of *reported* earnings, *not* the magnitude of earnings management, which is only correctly conjectured in equilibrium. In fact, earnings management represents the magnitude of deviation from the issuer's first best strategy—truthfully reporting earnings. In a typical signaling model, the marginal cost of signaling decreases with the favorableness of private information, and thus the better type sends a higher level of signal that is too costly for the lower type to mimic. In the current setting, the high-type firm has higher true earnings than does the low-type firm. Given that $C(m)$ is convex, it is thus cost effective for the high-type firm to signal its quality by further increasing its reported earnings.

Second, notice that in the above setting, the exogenously fixed ownership retention (α) plays a crucial role in determining the signaling cost and the nature of the resulting separating equilibrium. As earnings management is *value-detrimental* to the firm, a higher α makes over-reporting earnings more costly to the issuer and, thus, the earnings report more credible. In fact, when α is sufficiently large, the cost of earnings management is sufficient to deter θ^L from mimicking the earnings report of θ^H and truthful reporting constitutes an equilibrium. On the other hand, as is shown in the LP model, α itself could also be a signaling device to convey the issuer's private information. However, unlike earnings management, α does not affect the underlying firm value; it only imposes a personal cost on the risk-averse IPO issuer due to under-diversification. This suggests studying a general model that incorporates both ownership retention and reported earnings as endogenous signaling choices.

IV. THE GENERAL MODEL: MULTIVARIATE SIGNALING

I now consider the general model in which the IPO issuer simultaneously decides on both reported earnings and ownership retention to signal his private information. In this case, two interesting questions naturally arise: (1) Would the IPO issuer use *both* signals? (2) If so, then what determines the relative level of each signal used? I answer these questions in the framework of an *efficient* (or *Pareto-dominant*) signaling equilibrium in which the total signaling costs associated with the two signals are minimized. Using this equilibrium concept allows me to rule out equilibria with excessive, inefficient amounts of signaling by the better type firm (Milgrom and Roberts 1986). As will be shown in the subsequent analysis, firms with valuable inside information would use both signals, and the efficient mix of the two signals depends on the uncertainty about the firm's future earnings.

When both reported earnings and ownership retention could be used as signaling devices, the issuer's objective function is:

$$\max_{\alpha, r} U(\alpha, r, P(\alpha, r); \theta) \Leftrightarrow \max_{\alpha, r} \left\{ \alpha V(r; \theta) + (1 - \alpha)P(\alpha, r) - \frac{b}{2} \alpha^2 \sigma^2 \right\}. \quad (5)$$

With the single private attribute θ , many combinations of the two signals (ownership retention α and reported earnings r) may effectively deter the lower type's mimicking attempt, i.e., many signaling equilibria may exist. Among all such combinations, each supported by a pricing function P , the *efficient* signaling equilibrium must maximize the stockholders' *ex ante* wealth by minimizing total signaling costs.

Solving for the Efficient Equilibrium of the Model

To solve for the efficient signaling equilibrium, the approach here is to construct the equilibrium for the restricted case of the two types of firms and then extrapolate.⁸ Assume there are two types θ^H and θ^L with $\theta^H > \theta^L$ and $e^H \equiv \frac{\theta^H}{2} > e^L \equiv \frac{\theta^L}{2}$. The signaling problem can be analyzed by transforming it into an equivalent problem, labeled the non-mimicry problem. In this latter problem, θ^H selects a pair of signals $\{\alpha, r\}$ to deter θ^L 's attempts to mimic him by matching both signals. Further, the efficient mix of the two signals maximizes the utility that θ^H obtains in equilibrium by minimizing the total signaling costs. On the other hand, θ^H has no incentive to mimic θ^L , so θ^L is not faced with any non-mimicry constraint and would select the first-best $\{\alpha, r\}$, bear no signaling cost, and be correctly valued as θ^L in equilibrium. In other words, in the *efficient* signaling equilibrium, the strategies and beliefs in the model are defined as those that constitute a separating equilibrium, and are such that the dissipative costs of separation incurred are the least.⁹ Thus, the *efficient* signaling equilibrium in the model emerges as the solution to the following *non-mimicry* problem faced by θ^H :

$$\begin{aligned} \max_{\alpha, r} \quad & \theta^H - C(r - e^H) - \frac{b}{2} \alpha^2 \sigma^2 \\ \text{s.t.:} \quad & \alpha[\theta^L - C(r - e^L)] + (1 - \alpha)[\theta^H - C(r - e^H)] - \frac{b}{2} \alpha^2 \sigma^2 \leq \theta^L. \end{aligned} \quad (6)$$

To simplify notation, I denote $C(r - e^H)$ as $C^H(r)$ and $C(r - e^L)$ as $C^L(r)$. The following proposition shows that in the optimal solution, $\alpha > 0$ and $r > e^H$.

Proposition 3: In the efficient signaling equilibrium, a high-type firm with valuable private information will both overstate earnings and retain more than the first-best level of ownership.

Proof. See Appendix.

To answer the second question of what determines the optimal mix of the two signals used, I use comparative statics analysis to examine how the equilibrium levels of α and r change in response to changes in σ^2 . Figure 2 highlights the intuition and the mathematical proof is deferred to the Appendix. In Figure 2, the two thick solid curves depict the iso-cost curves for the high-type with σ_1^2 and σ_2^2 , respectively, where $\sigma_1^2 < \sigma_2^2$.¹⁰ The two dashed curves depict the non-mimicry constraints in Equation (6) corresponding to σ_1^2 and σ_2^2 , respectively, holding the low-type's mimicking utility constant at θ^L . The optimal signaling portfolio choice in the efficient equilibrium corresponding to σ_1^2 is indicated by point A where the iso-cost curve for the high-type and the non-mimicry constraint for the low-type are tangent to each other.

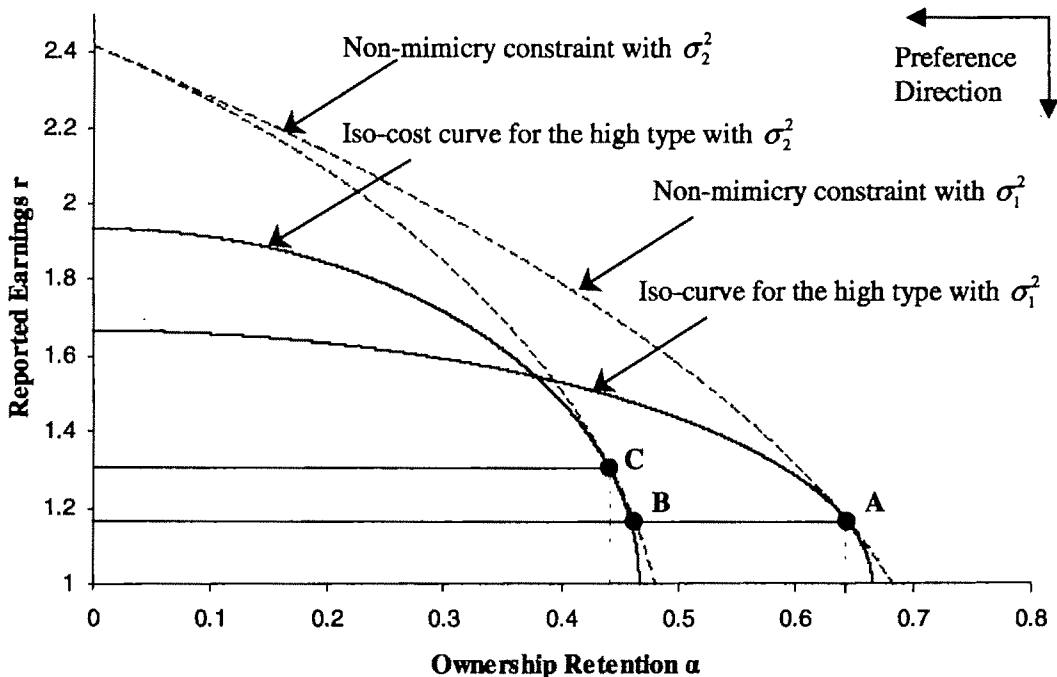
The graph illustrates that two effects take place as σ^2 increases. First, the non-mimicry constraint rotates inward, reflecting the fact that as the costs of retaining ownership increase,

⁸ The model can be extended numerically to a three-type scenario. The proof is not included in the paper due to space constraint, but can be provided to interested readers upon request.

⁹ See Milgrom and Roberts (1986) for a detailed discussion of why this is the appropriate equilibrium concept in signaling games.

¹⁰ The slope of the iso-cost curve is infinity at $r = 0$ and is zero at $\alpha = 0$, because for the high-type the signaling costs for both signals are zero at the margin.

FIGURE 2
How r and α Change with σ^2



The case illustrated is for the following values of the model parameters: e^L , the true earnings of the low-type firm, are 0.5; e^H , the true earnings of the high-type firm, are 1; b , the coefficient of absolute risk aversion, equals 1. The cost of earnings management $c(r, \theta)$ is equal to $\frac{1}{2}(r - (\theta/2))^2$ when $r > e = (\theta/2)$ and 0 otherwise. The firm value $V(r, \theta)$ as a function of reported earnings parameterized by firm type equals $(\theta - c(r, \theta))$. The two dashed curves depict the non-mimicry constraint with $\sigma_1^2 = 1$ and $\sigma_2^2 = 4$, respectively. The two solid curves depict the high-type's iso-cost curves with $\sigma_1^2 = 1$ and $\sigma_2^2 = 4$ that are tangent to the non-mimicry constraints under $\sigma_1^2 = 1$ and $\sigma_2^2 = 4$, respectively.

the high-type can retain a smaller proportion of equity to deter the low-type's mimicking attempt without changing reported earnings. This is reflected as a horizontal shift from point A to point B. Point B, however, will not be the optimal signaling portfolio choice for the high-type due to a second effect: as σ^2 increases, retaining ownership becomes relatively costlier for both types of issuers, but more so for the high-type than for the low-type since the high-type has lower marginal costs in overstating earnings, i.e., $C_r^H < C_r^L$. Thus, to make the iso-cost curve tangent with the non-mimicry constraint, the optimal cost-minimizing signaling portfolio requires a further reduction in ownership retention and a simultaneous increase in reported earnings, resulting in a move from point B to point C. Taken together, the two effects unambiguously reduce ownership retention and increase reported earnings, as generalized by the following proposition:

Proposition 4: *Ceteris paribus*, an increase in σ^2 will lead to a decrease in ownership retention, α , and an increase in reported earnings, r .

Proof. See Appendix.

To summarize, as σ^2 increases, retaining more ownership becomes relatively costlier for the risk-averse issuer. Hence, to achieve differentiation at minimal cost, the issuer of a high-value firm would retain less ownership, and resort more to earnings management.

V. EMPIRICAL HYPOTHESES AND EMPIRICAL PROXIES

Empirical Hypotheses

The above theoretical analysis generates several empirical implications, which can be classified into three categories. First, the model depicts a situation where income-increasing earnings management emerges as a rational-expectations equilibrium outcome. As such, exaggerated earnings will not be sustained in the long run, the firm's future operating performance would decline relative to its peak level in the issuing period. If the estimated discretionary accruals properly measures the amount of earnings management, i.e., it captures the temporarily inflated portion in reported earnings, then estimated discretionary accruals should predict the magnitude of such decline. On the other hand, since in equilibrium, investors rationally anticipate earnings management and factor it into the IPO price, they should not be surprised by the post-issue performance decline caused by the reversal of discretionary accruals. If properly estimated long-run abnormal stock returns captures the correction of investors' valuation errors over time, then there should be no systematic relationship between the issue period discretionary accruals and the post-issue long run abnormal stock returns. This leads to my first empirical hypothesis:¹¹

H1a: IPO firms engage in earnings management to increase income during the issuing period.

H1b: Discretionary accruals in the issuing period predict post-issue deterioration in IPO firms' operating performance, but do not predict post-issue abnormal stock returns.

Second, within the context of my model, the IPO issuer optimally employs two signals, the percentage of retained ownership and reported earnings, to distinguish its type from all lesser types that could not have mimicked it along both dimensions. This in turn implies that, in the efficient signaling equilibrium, rational investors would view both accounting earnings and ownership retention as valuable signals of firm type and price both positively, which leads to my second empirical hypothesis:

H2: Both accounting earnings and ownership retention are positively priced in the IPO market.

Third, comparative statics analysis shows that, in the *efficient* signaling equilibrium, the level of the two signals should be chosen simultaneously to minimize the cost of signaling firm value. *Ceteris paribus*, riskier IPO firms would choose to retain less ownership, but manage earnings to a greater extent to achieve separation. This leads to my third empirical hypothesis:

¹¹ It should be noted, however, that the above market efficiency hypothesis can be derived from any rational expectations equilibrium model involving earnings management, i.e., it is not unique to the signaling model presented in this paper. For example, Stein (1989) and Shivakumar (2000) both argue that, even in efficient capital markets, myopic behavior like window-dressing may persist as a Nash equilibrium outcome.

H3: IPO issuers with more uncertain future earnings manage earnings more and retain less ownership.

Sample and Empirical Proxies

The full sample is downloaded from Securities Data Corporation (SDC) Global New Issues database and consists of 2,629 firm-commitment initial public offerings taking place in the years 1987 to 1997. The sample period (1987–1997) is chosen for the following reasons. First, as my sample of IPO firms starts after 1986, I can directly calculate accruals from the cash flow statement using post-SFAS No. 95 data to avoid the measurement error associated with the balance sheet approach (Collins and Hribar 2002). Second, as suggested by Ritter and Welch (2002), many IPO phenomena are sample and time-period specific. As IPOs during the TWW sample (1980–1992) and TWR sample (1980–1990) clearly have poorer long-run returns than those in my sample period,¹² it is thus interesting to examine whether their results still hold in more recent years with different economic conditions. The sample period is largely non-overlapping with those used in TWW and TWR and also avoids the Internet IPO wave years. I define the fiscal year in which the IPO took place as the event year (year 0) and all other years are identified relatively. To allow for a reporting lag, the multiyear event window for the abnormal stock return performance begins four months after the fiscal year-end of year 0.

Table 1 presents descriptive statistics for the full sample. To be included in the sample, an IPO must have an offer price of at least \$1 and market capitalization of at least \$20 million (in 1997 prices) as calculated immediately after the offering. Unit offerings, Real Estate Investment Trusts (REITs) offerings (SDC Industry Code RI), offerings related to ADRs (SDC Security Type 847, 8470, 964, 804, 845, and 6138), regulated utility firms (SIC code between 4910 and 4939, inclusive) and financial firms (SIC codes between 6000 and 6999, inclusive) are excluded. SDC also provides information on dates of lock-up expirations and percentages of shares locked up as well as information about underwriters and auditors. Since data on the founding date for IPO firms are very limited on SDC, I obtain information on the founding year from Jay Ritter's IPO website.¹³ I calculate IPO firm age at the time of offering as the difference between the issue-year and the founding year. I also obtain underwriter rankings from the above website for the lead underwriters for each of the IPO firms in my sample. Stock return data and financial accounting data are obtained from CRSP and Compustat, respectively.

Using information from the above sources, I construct the following empirical proxies:

Ownership retention (α): Consistent with prior studies (Downes and Heinkel 1982; Feltham et al. 1991), retained ownership is measured by the number of shares held by owners prior to the new issue (adjusted by secondary offerings) divided by total shares outstanding after the new issue.¹⁴ In other words:

¹² The average three-year cumulative abnormal returns adjusted by value-weighted market index is -18.9 percent in the TWW sample, versus -7.2 percent in my sample (Table 5).

¹³ <http://bear.cba.ufl.edu/ritter/ipodata.htm>.

¹⁴ Many IPO firms had issued stock to employees, venture capital firms, insurance companies, and other private investors prior to going public, making it hard to identify the "issuer" in the modeling context. Thus, consistent with prior studies (Downes and Heinkel 1982; Feltham et al. 1991), I make the assumption that all parties owning the firm's stock prior to the public offering were insiders or, in the current model, issuers.

TABLE 1
Summary Statistics for the IPO Sample

Variable	n	Mean	Std. Dev.	Median	5th Pctl	95th Pctl
Panel A: Post-Offering Firm Characteristics						
Market Value (\$m)	2599	326.73	1171.58	129.91	24.38	1017.20
Book Value (\$m)	2609	84.01	254.15	39.60	7.10	283.16
Total Asset (\$m)	2613	224.30	820.62	63.79	13.91	824.11
MB	2560	4.99	25.41	3.14	1.16	10.68
Panel B: Immediate Post-Offering Firm Characteristics						
Age	2538	15.28	19.97	8.00	1.00	65.00
Offer Price (\$)	2629	12.49	4.64	12.00	6.00	20.50
Under Pricing (%)	2485	13.80	22.00	6.82	-4.17	53.00
Market Value Pro Forma (\$)	2629	227.93	1429.12	85.00	22.00	688.30
Ownership Retention (%)	2279	67.50	59.00	68.70	34.21	87.50

This table presents summary statistics of the 2,629 domestic IPOs for 1987–1997 with an offer price of at least \$1 and a market capitalization of \$20 million (in 1997 prices) as calculated immediately after the offering. The sample excludes REITs, unit issues, closed-end funds, ADR-related offerings, and financial and utility firms. Panel A characteristics are measured at the end of fiscal year 0 using Compustat data.

Panel B characteristics are measured at the time of the IPO using information provided by Security Data Corporation (SDC). SDC provides incomplete information about IPO firms' founding dates, and I fill in much of the missing data with the founding year information from Jay Ritter's website (<http://bear.cba.ufl.edu/ritter/ipodata.htm>) and calculate IPO firm age at the time of offering as the difference between the issue year and the founding year.

Market Value Pro Forma is calculated as total shares outstanding after offering times offer Price. Underpricing is calculated as the percentage difference between the closing price on the first day of trading and the offer price.

$$\alpha = \frac{N_{\text{before}} - N_{\text{secondary}}}{N_{\text{after}}}, \quad (7)$$

where:

N_{before} = total number of shares outstanding before the offering;
 N_{after} = total number of shares outstanding after the offering; and
 $N_{\text{secondary}}$ = number of secondary shares offered during the offering.

For the full sample of firms, the mean percentage of retained ownership is 67.5 percent (Table 1, Panel B), with the .95 and .05 percentiles of α being 34.2 percent and 87.5 percent. There is little variation across years or industries. In general, even if there is a sharp decline in ownership after the IPO, the post-offering stake is still substantial.

Earnings management (m): Consistent with prior literature, discretionary accruals estimated from the cross-sectional adaptation of the modified Jones model (Dechow et al. 1995) are used as the primary measure of earnings management. The estimation procedure is as follows. First, total accruals are calculated directly from the statement of cash flows (annual Compustat data items are indicated parenthetically), as suggested by Collins and Hribar (2002):

$$ACC_{it} = EBXI(\#123) - CFO(\#308 - \#124), \quad (8)$$

where:

EBXI = earnings before extraordinary items and discontinued operations; and
CFO = cash flow from continuing operations.¹⁵

The expected accruals under the modified Jones model is measured by:

$$E\left[\frac{ACC_{it}}{TA_{i,t-1}}\right] = a_0\left(\frac{1}{TA_{i,t-1}}\right) + a_1\left(\frac{\Delta REV_{it} - \Delta RDC_{it}}{TA_{i,t-1}}\right) + a_2\left(\frac{GPPE_{it}}{TA_{i,t-1}}\right), \quad (9)$$

where:

ACC_{it} = total accruals (#123 – (#308 – #124)) for sample firm *i* in year *t*;
TA_{it-1} = total assets (#6) for sample firm *i* in year *t*–1;
 ΔREV_{it} = change in net revenues (#12) for sample firm *i* over year *t*;
 ΔREC_{it} = change in accounts receivable (#2) for sample firm *i* over year *t*; and
GPPE_{it} = gross property, plant, and equipment (#7) for firm *i* in year *t*.

Ordinary least squares is used to obtain industry-specific estimates of the coefficients, i.e., for each firm-year in the IPO sample, the model parameters a_0 , a_1 , and a_2 are estimated using a contemporaneous estimation sample of all two-digit SIC code peers in the same fiscal year but excluding firms within ± 2 years of IPO/SEO offerings. More specifically, I estimate the following model by year and industry:¹⁶

$$E\left[\frac{ACC_{it}}{TA_{i,t-1}}\right] = a_0\left(\frac{1}{TA_{i,t-1}}\right) + a_1\left(\frac{\Delta REV_{it}}{TA_{i,t-1}}\right) + a_2\left(\frac{GPPE_{it}}{TA_{i,t-1}}\right). \quad (10)$$

Discretionary accruals (as percentage of lagged total assets, *TA_{it-1}*) for IPO firm *i* for year *t* are represented by:

$$DAC_{it} = \frac{ACC_{it}}{TA_{i,t-1}} - \left[\hat{a}_0\left(\frac{1}{TA_{i,t-1}}\right) + \hat{a}_1\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{TA_{i,t-1}}\right) + \hat{a}_2\left(\frac{GPPE_{it}}{TA_{i,t-1}}\right) \right], \quad (11)$$

where $\hat{a}_0$, $\hat{a}_1$, and $\hat{a}_2$ are the estimates of a_0 , a_1 , and a_2 from the annual cross-sectional two-digit SIC industry regression (10).

Discretionary accruals models based on the Jones or modified Jones model have been widely criticized for producing noisy measures of earnings management. Dechow et al.

¹⁵ To provide a cash flow from continuing operations, the cash portion of discontinued operations and extraordinary items (#124) is subtracted from total cash from operations (#308).

¹⁶ In order to have meaningful parameter estimates, I require the estimation sample to have at least 20 observations and exclude influential observations satisfying any of the following conditions: the absolute value of DFFITS is greater than 2, the absolute value of STUDENT is greater than 2, or COOKD is greater than 2 (Belsley et al. 1980).

(1995) find that the modified Jones model is severely misspecified for firm-periods experiencing nonrandom performance, in that firms with extremely high (low) earnings tend to have positive (negative) accrual prediction errors. McNichols (2000) also shows that discretionary accruals from the commonly used Jones or modified Jones model are correlated with long-term earnings growth. Using a general econometric framework, McNichols and Wilson (1988) show that the correlation between the measurement error in discretionary accruals and the partitioning variable of interest could generate biased results in testing for the presence of earning management. As a nonrandom sample, IPO firms are likely to experience strong earnings performance and are strongly tilted toward small-growth firms, which suggests that at the time of the IPO, we could observe a positive mean accruals prediction error even if the null hypothesis of no earnings is true. It has also been argued that IPO firms time their offerings to coincide with periods of peak performance and favorable stock market conditions, i.e., when the market is likely to overvalue IPOs (see, for example, Ritter 1991; Jain and Kini 1994). Hence, the post-issue decline in operating and stock performance of IPO firms that TWW and TWR attribute to the reversal of earnings management is also potentially confounded by the correlation between performance and the measurement error in discretionary accruals.

To mitigate such possible inference bias resulting from the correlation between measurement error in discretionary accruals and the variables of interest, I adopt an industry- and performance-matching approach to calculate an adjusted discretionary accruals measure, similar to that suggested by Kothari et al. (2005). More specifically, each IPO firm-year observation (from year 0 to year 4) is matched with a non-issuing firm in the same industry, and with similar return on assets during the same fiscal year. The matching process is started on the four-digit SIC code level, i.e., I first select a firm with the closest return on assets (ROA) to the IPO firm's ROA. If the percentage difference in this measure between the sample firm and the control firm is greater than 20 percent, I move to the three-digit SIC level to find the closest match. If the percentage difference is still greater than 20 percent, I move to the two-digit SIC level, and finally to the one-digit SIC level to find the closest match.¹⁷ The discretionary accruals for nonsample firms are estimated as the residuals from the annual cross-sectional two-digit SIC industry regression (10) using all Compustat observations in 1987–2001 but excluding firms already represented in the IPO sample.¹⁸ The performance-matched discretionary accruals ($ADJDAC_{it}$) for sample firm i and year t are calculated as the difference between DAC_{it} from the modified Jones model and the corresponding discretionary accruals of a performance-matched firm in year t . I denote such performance-adjusted discretionary accruals estimates as $ADJDAC_{it}$.

Uncertainty regarding future earnings (σ^2): To be consistent with the theoretical model, an ideal proxy is one that represents the *ex ante* uncertainty about firm-specific variations in the future value of the firm, which should be common knowledge to all market participants prior to the offering. Various *ex ante* risk measures have been used in the

¹⁷ The above matching procedure is able to obtain close matches for the majority of IPO firms. Of all IPO sample firm-year observations, 58.7 percent are matched on three-digit SIC codes, and 73.1 percent are matched on at least two-digit SIC codes. 59.3 percent of the matched firms' ROAs are within 80 percent to 120 percent of the IPO firms' ROAs. The t-statistic for the difference in means of the two distributions is not statistically significant.

¹⁸ A total of 1,110 annual cross-sectional regressions and 181,575 Compustat observations in the annual full coverage, industry, and research files from 1987–2001 are used. To mitigate the effect of outliers, for each annual cross-sectional industry regression, all variables are trimmed at the top and bottom 1 percent. I also eliminate from each regression all influential observations with one of the following conditions: absolute value of DFFITS greater than 2, absolute value of STUDENT greater than 2, and COOKD greater than 1, per Belsley et al. (1980).

literature, for example, the number of items listed in prospectus under the caption “risk factors” (Simunic and Stein 1987) and the standard deviation of net income in the pre-IPO years (Copley and Douthett 2002). However, since SDC does not provide the number of risk factors and since Compustat does not have enough pre-IPO time-series information, these proxies are not feasible here. Some other studies employ as an *ex post* risk proxy the standard deviation of daily returns for the year or so after the IPO (Carter et al. 1998). Although this market-based proxy is more closely aligned with the conventional perception of investment risk, it includes *ex post* information that is not known at the time of the IPO, and could potentially generate biased inference. To get a cleaner proxy for *ex ante* expected risk, I construct a market-based *ex ante* measure of firm-specific risk using a matched-sample approach similar to that used by Lowry and Shu (2002). More specifically, for each IPO firm, I first identify all firms with the same three-digit SIC code and market capitalization ranging between 80 percent and 120 percent of the IPO firm, where the market capitalization of both the IPO firm and the control firms is measured at the close of the IPO firm’s first trading day. I then calculate the average of the standard deviations of daily stock returns for the matched sample over the one year prior to the IPO.¹⁹ To the extent that the return volatilities of similar firms should be correlated, this measure should provide an estimate of the IPO firm’s future uncertainty based on common information at the offering. Indeed, in my sample, the correlation between such an *ex ante* measure and the *ex post* volatility of IPO firms’ daily stock returns is significantly positive (the Pearson and Spearman correlations are 0.23 and 0.29 respectively, and both are highly significant with a two-tailed *p*-value < 0.001).

VI. TESTS OF MARKET EFFICIENCY: H1a AND H1b

Discretionary Accruals and Post-Issue Changes in Various Performance Measures

First, I examine the time-series profile of discretionary accruals and various performance measures for my IPO sample. Panel A in Table 2 reports the mean and median discretionary and nondiscretionary accruals from the issue-year to four years after. *DAC_t* denotes discretionary accruals estimated using the modified Jones model and *ADJDAC_t* denotes performance-adjusted discretionary accruals, where *t* = 1 to 4 denotes the fiscal year relative to the event year (year 0). To reduce the effect of a few large outliers on the mean statistic, in both panels, the means are obtained after trimming the data at the 1st and 99th percentiles. The largest *DAC_t* occurs in year 0, with both mean (3.76 percent of lagged assets) and median (1.69 percent of lagged assets) being highly statistically significant. It then declines over time and eventually becomes significantly negative after year 3.

Compared to *DAC_t*, *ADJDAC_t* shows a similar pattern. The top and bottom 1 percent trimmed mean (median) issue-year *ADJDAC₀* is 2.62 percent (1.71 percent) of lagged assets, and is highly statistically significant. Both the mean and median *ADJDAC_t* decline over time and become significantly negative in year 3. Such evidence is consistent with managers advancing accruals to increase reported net income in the issue-year.

Panel B in Table 2 reports the time-series distribution from the issue-year to four years after for three accounting measures of operating performance: operating income per dollar of sales (*OISALES*), profit margin (*PFMARGIN*), and return on assets (*ROA*). Similar to Loughran and Ritter (1995), these three measures are defined as follows:

¹⁹ Lowry and Shu (2002) argue that many firms use similar approaches in practice. For example, many pre-IPO or IPO firms calculate the value of outstanding options using the volatility of comparable firms in the Black-Scholes model.

TABLE 2
Time-Series Profile of Discretionary Accruals and Operating Performance Measures
 (from fiscal year of IPO to four years after)

Variable	Year 0	Year 1	Year 2	Year 3	Year 4
Panel A: Discretionary Accruals					
DAC_t (as % of lagged asset)					
Mean	3.76***	0.50**	-0.39***	-1.62***	-0.90**
Median	1.69***	0.61**	-0.08*	-0.95***	-0.92***
n	2039	2120	1946	1737	1544
$ADJDAC_t$ (as % of lagged asset)					
Mean	2.62*	0.27*	-1.89**	-4.18**	-2.62***
Median	1.71***	0.56**	-0.35*	-2.02**	-0.93***
n	2031	2108	1937	1726	1536
Panel B: Various Operating Performance Measures					
$OISALES_t$ (%)					
Median	12.41***	11.06***	9.65***	8.80***	8.70***
$PFMARGIN_t$ (%)					
Median	4.24***	3.55***	2.35***	1.60***	1.10***
ROA_t (%)					
Median	8.32***	5.47***	3.49***	2.24***	1.53***

*, **, *** Denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively, two-tailed, based on T distribution for means, Wilcoxon for median.

The means are trimmed at the top and bottom 1 percent.

Panel A presents the time-series profile of DAC_t and $ADJDAC_t$, i.e., discretionary accruals and performance-adjusted discretionary accruals estimated from cash flows statement using the modified Jones model. To generate the industry- and performance-matched control samples, each IPO firm-year is matched with an industry non-issuing peer with the closest to within 80 percent and 120 percent of the IPO firm's return on assets. The matching procedure begins from the same four-digit SIC codes, and when no match is found, firms with the same three-digit, then two-digit, and finally one-digit SIC codes are used. Performance-adjusted discretionary accruals are the discretionary accruals of the IPO firm minus the discretionary accruals of the matched firm.

Panel B presents the time-series profile of various operating performance measures. More specifically:

$OISALES_t$ = operating income before depreciation (#13) in year t /sales in year t (#12);

$PFMARGIN_t$ = net income in year t (#172)/sales in year t (#12); and

ROA_t = net income before extraordinary items in year t (#18)/assets of year $t-1$ (#6).

$OISALES_t$ = operating income before depreciation (#13) in year t /sales in year t (#12);²⁰

$PFMARGIN_t$ = net income in year t (#172)/sales in year t (#12); and

ROA_t = net income before extraordinary items in year t (#18)/assets of year $t-1$ (#6).

Because of the influence of outliers on the means and skewness in the distribution of the accounting ratios (Barber and Lyon 1996), I report median values and significance levels based on nonparametric Wilcoxon signed rank test. In Panel B of Table 2, the first row under each operating performance measure label reports the corresponding raw performance

²⁰ Loughran and Ritter (1995) deflate operating income by total assets, which includes interest-earning short-term investments that many issuers temporarily invest some IPO proceeds in prior to investing in operating assets. To be consistent with such an asset deflator, Loughran and Ritter (1995) add interest income (Compustat data item #62) to operating income before depreciation (#13). However, as I deflate operating income by total sales, I exclude interest income from the operating income measure.

measures. For the median issuer, *ROA* decreases to 1.53 percent four years after the offering relative to 8.32 percent in the year of the offering. Median profit margin (*PFMARGIN*) declines from 4.24 percent in the offering year to 1.10 percent four years after the offering. One drawback of the above two operating performance measures, however, is that they are affected by a change in the issuing firm's assets-in-place and/or interest expenses,²¹ whereas operating income per dollar of sales (*OISALES*) is not. *OISALES* declines from 12.41 percent in the issuing year to 8.70 percent four years subsequent to the offering, again confirming that operating performance deteriorates following the IPO.

The above evidence shows that IPO issuers in general experience a substantial operating performance decline in the years following the offering. Next, I directly examine whether the decline in post-issue operating performance of IPO firms differs systematically according to the magnitude of the IPO-year discretionary accruals. If the issuer uses discretionary accruals to shift income from the future, then I expect a negative relationship between the two. To test this prediction, I sort IPO firms by their issue-year discretionary accruals into five portfolios and examine the post-issue change in various operating performance measures in cross section. The summary measures of the average post-issue change in *OISALES*, *PFMARGIN*, and *ROA* corresponding to the three-year horizon after the issue are constructed as follows:

$$\begin{aligned}\Delta OISALES_3 &= \frac{1}{3} \sum_{t=1}^3 OISALES_t - OISALES_{-1}; \\ \Delta PFMARGIN_3 &= \frac{1}{3} \sum_{t=1}^3 PFMARGIN_t - PFMARGIN_{-1}; \text{ and} \\ \Delta ROA_3 &= \frac{1}{3} \sum_{t=1}^3 ROA_t - ROA_{-1}^*.\end{aligned}$$

To avoid the spurious correlation between issue-year discretionary accruals and post-issue change in operating performance that might arise when the changes are measured relative to year 0, I calculate the post-issue change in operating performance relative to year -1 under each operating performance measure.²² Because year -2 total assets is generally not available in Compustat, in calculating the *ROA* of year -1 (ROA_{-1}^*), I deflate year -1 net income (#18) by year -1 total assets (#6). The first row in Table 3 under each operating performance measure label presents the average post-issue decline in the corresponding performance measure relative to year -1 across the five issue-year discretionary accruals (*DAC*₀) portfolios, with Q5 being the most aggressive earnings management portfolio (largest *DAC*₀), and Q1 being the least aggressive earnings management portfolio (smallest *DAC*₀). All three measures exhibit a monotonic decrease from Q1 to Q5. The medians of the three measures are significantly positive in Q1 and then drop to a significantly negative level in Q5. The difference between Q1 and Q5 is highly statistically significant based on the Wilcoxon z-statistic for median. The second row in Table 3 under each operating performance measure label shows very similar results when quintiles are formed based on the issue-year performance-adjusted discretionary accruals measure (*ADJDAC*₀).

²¹ Untabulated evidence shows that there is a sharp increase in total assets for the sample IPO firms in the issue-year.

²² In untabulated results, I find that when post-issue change in operating performance is measured relative to year 0, the predictive power of issue-year discretionary accruals is stronger in both magnitude and statistical significance.

TABLE 3
Post-Issue Changes in Operating Performance across DAC_0 ($ADJDAC_0$) Quintiles

Variable	Q1	Q2	Q3	Q4	Q5	Q1-Q5
ΔROA_3 (%)						
median (DAC_0)	1.88***	1.64**	0.53	-2.05***	-5.05***	z-stat: 5.12***
median ($ADJDAC_0$)	1.94***	1.12	0.35	-2.34***	-3.73***	z-stat: 3.74***
$\Delta OISALES_3$ (%)						
median (DAC_0)	1.72***	0.25	-0.10	-0.87***	-2.47***	z-stat: 5.03***
median ($ADJDAC_0$)	1.83***	0.31	-0.09	-1.10***	-1.79***	z-stat: 3.97***
$\Delta PFMARGIN_3$ (%)						
median (DAC_0)	1.91	0.07	-0.10**	-1.46***	-3.99***	z-stat: 3.92***
median ($ADJDAC_0$)	0.64*	0.00	-0.00**	-1.92***	-3.54***	z-stat: 4.42***

*, **, *** Denote significance at the 10 percent, 5 percent, and 1 percent levels (for a two-sided test), respectively.

DAC_0 is the issue year discretionary accruals calculated from the modified Jones model. $ADJDAC_0$ is the issue-year performance-adjusted discretionary accruals. Q1 firms are most conservative (smallest issue-year discretionary accruals) and Q5 firms are most aggressive (largest issue-year discretionary accruals). The z-statistics for testing the differences between the Q1 and Q5 is calculated according to Wilcoxon two-sample signed rank test, which assumes that the observations are independent.

Definitions of other variables:

$$\Delta ROA_3 = \frac{1}{3} \sum_{t=1}^3 ROA_t - ROA_{-1}^*;$$

$$\Delta OISALES_3 = \frac{1}{3} \sum_{t=1}^3 OISALES_t - OISALES_{-1}; \text{ and}$$

$$\Delta PFMARGIN_3 = \frac{1}{3} \sum_{t=1}^3 PFMARGIN_t - PFMARGIN_{-1};$$

where ROA_{-1}^* is calculated as year -1 net income (#18) over total assets at the beginning of year 0.

To better control for other factors that might cause the post-issue decline in operating performance, I also regress the average decline of ROA in the three post-issue-years relative to year -1 (ΔROA_3) on the issue-year discretionary accruals (DAC_0), with the average capital expenditure in year 0 and year 1 scaled by total assets at the beginning of year 0 ($CAPEXP_{01}$) and change in cash flows from year -1 to year 0 scaled by total assets at the beginning of year 0 ($CHCFO_0$) included as additional control variables.²³ If IPO firms use the IPO proceeds to make investments that benefit long-run operating performance, then capital expenditures surrounding the issuing period would induce a mechanical decline in post-issue earnings (Rangan 1998). I therefore include asset-scaled average capital expenditures in year 0 and year 1 ($CAPEXP_{01}$) as an explanatory variable in the regression. If IPO firms time their offerings to coincide with periods of peak performance (Jain and Kini 1994) that cannot be sustained in the long run, then deterioration in operating performance will be observed subsequent to the issue, even in the absence of earnings management. Therefore, the asset-scaled year 0 change in cash flows ($CHCFO_0$) is included as an additional explanatory variable to mitigate potential spurious correlation between discretionary

²³ To mitigate the effect of outliers, in this and subsequent regressions (except the calendar-time portfolio regressions), I truncate the top and bottom 1 percent observations in each variable (except the indicator variables). I also exclude potential influential observations identified by any of the following conditions per Belsley et al. (1980): absolute value of DFFITS is greater than 2, absolute value of STUDENT is greater than 2, and COOKD is greater than 1.

accruals and future changes in operating performance induced by contemporaneous correlations between the discretionary accruals and change in cash flows in the IPO year. The first column in Table 4 reports the result of regressing ΔROA_3 on DAC_0 , $CAPEXP_{01}$, and $CHCFO_0$. The coefficient on DAC_0 is negative and statistically significant. The second column in Table 4 reports the result of regressing ΔROA_3 on $ADJDAC_0$, $CAPEXP_{01}$, and $CHCFO_0$. It shows that similar results hold when the performance-adjusted discretionary accruals ($ADJDAC_0$) is used. The coefficient on $ADJDAC_0$ remains highly statistically significant.

To summarize, consistent with the prediction of H1a, operating performance of IPO firms deteriorates on both an absolute and relative basis subsequent to the issue-year. The patterns are consistent with IPO firms advancing accruals to increase reported net income in the issuing period. Subsequently, the reversal in post-issue accruals causes a post-IPO decline in earnings. These results are robust with respect to alternative measures of earnings management and operating performance.

TABLE 4
Regression of ΔROA on Yr0 Variables

Variable	ΔROA_3	
	Coefficient	Coefficient
DAC_0	-0.185*** [-7.28]	
$ADJDAC_0$		-0.098*** [-4.78]
$CHCFO_0$	-0.063* [-3.64]	-0.067* [-4.40]
$CAPEXP_0$	-0.006 [-0.61]	-0.012 [-1.30]
Year Dummies	Included	Included
Adj. R^2	0.0334	0.0220
Prob(F)	<0.0001	<0.0001
No. of Obs.	1695	1691

*, **, *** Denote significance at the 10 percent, 5 percent, and 1 percent levels (for a two-sided test), respectively.

t-statistics are in brackets below each coefficient estimate.

To reduce influence of outliers, all variables in the regressions are trimmed at the top and bottom 1 percent.

Influential observations with one of the following conditions are deleted: absolute value of DFFITS greater than 2, absolute value of STUDENT greater than 2, or COOKD greater than 1.

Variable Definitions:

DAC_0 = issue-year discretionary accruals calculated from the modified Jones model;

$ADJDAC_0$ = issue-year performance-adjusted discretionary accruals;

$$\Delta ROA_3 = \frac{1}{3} \sum_{t=1}^3 ROA_t - ROA^*_{-1};$$

$CAPEXP_{01}$ = average capital expenditure (#128) in year 0 and year 1, scaled by total assets at the beginning of the issue year (year 0); and

$CHCFO_0$ = change in cash flows (#308 - #124) from year -1 to year 0, scaled by total assets at the beginning of year 0 (#6);

where ROA^*_{-1} is calculated as year -1 net income (#18) over total assets at the beginning of year 0.

Discretionary Accruals and Post-Issue Abnormal Stock Returns

Given the above evidence, I next examine whether the market is surprised when earnings declines related to discretionary accruals take place in the post-issue period. To measure long-term abnormal stock returns, I need an estimator of abnormal performance and a means for determining the distribution of the estimator, both are much debated issues in the asset-pricing literature. Thus, the approach here is to use alternative methodologies (event-time portfolio analysis, calendar-time portfolio analysis) and alternative measures of computing abnormal returns (buy-and-hold and cumulative abnormal returns, with and without rebalancing) with a variety of benchmarks (raw, market-adjusted, Fama and French [1993] adjusted).

Event-Time Portfolio Analysis

Under this approach, I first sort the sample firms into quintiles based on issue-year discretionary accruals (DAC_0). Q5 is the most aggressive earnings management portfolio (largest DAC_0), and Q1 is the most conservative earnings management portfolio (smallest DAC_0). The average three-year post-issue abnormal returns calculated using alternative methods and relative to different benchmarks are then computed for each quintile and examined for systematic variation across the quintiles. A monotonic decrease in the risk-adjusted returns from the lowest to the highest quintile provides evidence consistent with the ability of issue-year discretionary accruals to predict post-issue stock returns.

As the data attrition rate of my IPO sample is on average 9 percent per year, I follow the procedure outlined in Shumway and Warther (1999) to correct for the delisting bias documented in prior studies (Shumway 1997). More specifically, when firms delist but the return is missing, I assume that delisting for “negative” reasons as judged by the delisting code results in a return of -30 percent for NYSE/AMEX firms and a return of -55 percent for Nasdaq firms. To comprehensively measure investor experiences, I calculate buy-and-hold (cumulative) raw and abnormal stock returns with and without portfolio rebalancing. This is done for two reasons. First, it is widely documented that long-run returns are sensitive to the computation method (Barber and Lyon 1997; Kothari and Warner 1997). Second, even though no rebalancing might represent the experience of individual naive investors who make portfolio-allocation choices infrequently, large institutional investors, a particularly important group of investors for IPO firms (Field and Lowry 2004), trade frequently and monthly portfolio rebalancing may be the relevant benchmark.²⁴

Table 5 reports the means of raw and abnormal returns relative to alternative benchmark returns (i.e., CRSP value-weighted and equal-weighted market return indices) with and without monthly portfolio rebalancing across the issue-year discretionary accruals quintiles. Notice that even though there is difference in long-run stock returns between Q1 and Q5, the mean abnormal stock returns does not monotonically decrease from Q1 to Q5. Contrary to the hypothesis that the investors are surprised by post-issue decline in operating performance caused by the reversion of discretionary accruals, the most aggressive earnings management portfolio (Q5) rarely has the lowest abnormal returns and the most conservative earnings management portfolio (Q1) rarely has the highest abnormal returns. In fact,

²⁴ In calculating portfolio buy-and-hold (cumulative) returns without rebalancing, I compound (sum) individual IPO firm's stock returns over time and then calculate the portfolio average of individual firm's compounded (summed) returns. Because of delisting, not all sample firms have a full three years of valid return data. I fill in missing sample firm returns with the benchmark returns. In calculating portfolio returns with monthly rebalancing, for each month, I first calculate the portfolio average of the constituent sample firms' monthly returns and then compound (sum) the monthly average portfolio returns over time. This procedure mimics a trading strategy that rebalances the portfolio monthly, assigning equal weight to those stocks still in existence.

TABLE 5
Post-Issue Change in Operating Performance across DAC₀ Quintiles

<u>Return</u>	<u>Q1</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>	<u>Q5</u>	<u>All</u>
Cumulative (%):						
Raw Return						
without monthly rebalancing	56.1	49.1	43.5	48.4	52.6	49.9
with monthly rebalancing	49.9	51.6	51.4	38.9	45.0	47.2
Market Adj., Value-Weighted						
without monthly rebalancing	-4.8	-3.2	-3.1	-13.5	-11.5	-7.2
with monthly rebalancing	-3.1	-1.9	-2.2	-14.0	-8.9	-6.1
Market Adj., Equal-Weighted						
without monthly rebalancing	3.5	3.8	3.6	-7.8	-4.1	-0.2
with monthly rebalancing	5.0	5.3	4.7	-8.4	-1.7	0.9
Buy-and-Hold (%):						
Raw Return						
without monthly rebalancing	87.7	45.3	73.5	52.6	47.2	49.0
with monthly rebalancing	62.0	65.9	66.1	46.5	54.4	59.0
Market Adj., Value-Weighted						
without monthly rebalancing	-21.2	-16.3	3.8	-16.9	-21.7	-10.3
with monthly rebalancing	-6.7	-3.9	-4.0	-22.4	-16.0	-10.6
Market Adj., Equal-Weighted						
without monthly rebalancing	16.6	-3.5	16.0	-5.0	-7.6	3.3
with monthly rebalancing	6.4	7.9	7.2	-13.4	-4.0	0.8
No. of Obs.	415	416	415	416	415	2077

The holding period is five to 40 months after the fiscal year-end of the IPO issue year. Quintile 1 firms are most conservative (smallest issue year discretionary accruals) and Quintile 5 firms are most aggressive (largest issue year discretionary accruals). Due to cross-sectional correlation problems, *t*-statistics are not reported here since they cannot be translated into *p*-values. I follow the procedure outlined in Shumway and Warther (1999) to correct for the delisting bias. More specifically, when firms delist but the return is missing, I assume delisting for "negative" reasons as judged by the delisting code results in a return of -30 percent for NYSE/AMEX firms and a return of -55 percent for Nasdaq firms.

In calculating portfolio buy-and-hold (cumulative) returns without rebalancing, I compound (sum) individual IPO firms' stock returns over time and then calculate the portfolio average of individual firms' compounded (summed) returns. Because of delisting, not all sample firms have a full three years of valid return data, I fill in missing sample firm returns with the benchmark returns. In other words:

$$CAR_T \text{ (portfolio cumulative abnormal return)} = \frac{1}{N} \sum_{i=1}^N \left[\sum_{t=1}^T (r_{it} - m_t) \right];$$

$$BH_T \text{ (portfolio buy-and-hold abnormal return)} = \frac{1}{N} \sum_{i=1}^N \left[\prod_{t=1}^T (1 + r_{it}) - \prod_{t=1}^T (1 + m_t) \right];$$

where r_{it} and m_t are monthly raw and benchmark returns for firm i and month t , and N is the number of firms. Quintile (abnormal) returns are averages of the constituent firm (abnormal) returns.

In calculating portfolio returns with monthly rebalancing, for each month, I first calculate the portfolio average of the constituent sample firms' monthly returns and then compound (sum) the monthly average portfolio returns over time. This procedure mimics a trading strategy that rebalances the portfolio monthly, assigning equal weight to those stocks still in existence. In other words:

$$CAR_T \text{ (portfolio cumulative abnormal return)} = \sum_{t=1}^T \left[\frac{1}{N} \sum_{i=1}^N (r_{it} - m_t) \right];$$

$$BH_T \text{ (portfolio buy-and-hold abnormal return)} = \prod_{t=1}^T \left[\frac{1}{N} \sum_{i=1}^N (1 + r_{it}) \right] - \prod_{t=1}^T (1 + m_t);$$

where r_{it} and m_t are monthly raw and benchmark returns for firm i and month t , and N is the number of surviving firms in month t . Quintile (abnormal) returns are averages of the constituent firm (abnormal) returns.

there is often an increase in abnormal stock returns from Q1 to Q2, and an increase from Q4 to Q5. Q4 often turns out to be the worst-performing portfolio.

Calendar-Time Portfolio Regression Analysis

As Fama (1998) points out, the buy-and-hold returns, while conceptually more representative of an investor's investment experience, do not adequately control for cross-sectional correlation among individual firms and are, therefore, likely to yield overstated t-statistics in event-time regressions where the post-offering stock returns are regressed on issue-year discretionary accruals in event time. Test statistics calculated from buy-and-hold returns are also misspecified due to the severe skewness of the distribution of buy-and-hold returns in many studies.²⁵

Notice that cross-sectional dependence is of paramount concern in this study since my sample of over 2,600 IPO events is certainly affected by calendar-time clustering and substantial overlapping of the post-IPO horizons. An alternative approach to measuring the long-term stock price performance is to track the performance of quintile DAC_0 portfolios in calendar time relative to either an explicit asset-pricing model or some other benchmark (Fama 1998). Under this approach, cross-correlations of event-firm abnormal returns are automatically accounted for in the portfolio variance. Also, skewness is no longer an issue as this approach uses monthly portfolio returns.

Under this approach, quintiles are formed for each month based on issue-year discretionary accruals measured from May 1988 through January 2002 by sorting all sample firms whose three-year stock return event window starts in the previous 36 months. The calendar-time portfolios are rebalanced monthly to reflect the changing portfolio composition, i.e., dropping all companies that just reached the end of their three-year event windows and adding all new companies that just started their three-year event windows. The equal-weighted returns are then computed for each quintile. To control for the difference in the risk exposure across the quintiles, I regress the monthly quintile returns (in excess of risk-free rate) on the three Fama and French (1993) factors, as in the following equation:

$$R_{pt} - R_{ft} = a_p + b_p RMF_t + s_p SMB_t + h_p HML_t + e_{p,t} \quad (12)$$

where R_{ft} is the 30-day T-bill yield in month and the three factors (defined in Table 6) are obtained from Kenneth French's website.²⁶

The regressions are carried out separately for each quintile. Because the portfolio in any given month may contain from 1 to over 900 firms, I estimate the regression using weighted least squares to mitigate heteroscedasticity, where the weight is the square root of the number of firms in each month (Franks et al. 1991). If the Fama-French model provides a complete description of expected returns, then the intercepts are expected to be 0 if DAC_0 has no effect. Thus, any significant differences between the intercepts of the aggressive and conservative discretionary accruals portfolios are attributed to differences in issue-year discretionary accruals.

Table 6 reports the estimated intercepts and other coefficients with the associated t-statistics. The intercepts from the Fama-French three-factor regression are insignificant for all quintiles. Further, even though the intercept of the aggressive quintile is lower than that of the conservative quintile, the difference is not significant based on the two-tailed p-value.

²⁵ The skewness problem is usually corrected by a bootstrapping method; however, bootstrapping does not address the issue of cross-sectional correlation.

²⁶ http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

TABLE 6
Calendar Time Portfolio Regression with DAC_0 Quintiles

Variable	DAC_0 Quintiles					$ADJDAC_0$ Quintiles				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
a_p (Intercept)	0.0008 [0.24]	0.0013 [0.45]	0.0009 [0.34]	-0.0016 [-0.48]	-0.0048 [-0.16]	0.0016 [0.56]	-0.0001 [-0.04]	-0.0015 [-0.54]	-0.0006 [-0.17]	-0.0014 [-0.61]
$b_p(RMF)$	1.0788*** [11.75]	1.0589*** [12.66]	1.1765*** [14.28]	1.0579*** [11.27]	1.1738*** [11.35]	1.0014*** [12.90]	1.1285*** [15.53]	1.0558*** [13.60]	1.1269*** [12.44]	1.1974*** [10.30]
$s_p(SMB)$	1.1525*** [12.29]	0.8825*** [10.33]	0.8585*** [11.15]	1.0102*** [10.54]	1.1028*** [10.63]	1.1942*** [15.07]	0.8586*** [11.57]	0.8446*** [10.65]	0.9644*** [10.43]	1.2371*** [10.42]
$h_p(HML)$	-0.4278*** [-3.50]	-0.0205 [-0.18]	0.0505 [0.50]	-0.1944 [-1.56]	-0.2663** [-1.98]	-0.5424*** [-5.25]	-0.0270 [-0.28]	0.1059 [1.03]	-0.0554 [-0.46]	-0.2035 [-1.32]
Adj. R^2	0.8027	0.7367	0.7632	0.7412	0.7344	0.8576	0.7911	0.7362	0.7394	0.7169
$a_p(Q5)-a_p(Q1)$			0.0056					0.0030		
t-statistic			[1.53]					[1.08]		
two-sided p-value			0.13					0.28		
No. of Obs.	165 months: May 1998–January 2002					165 months: May 1998–January 2002				

*, **, *** Denote significance at the 10 percent, 5 percent, and 1 percent levels (for a two-sided test), respectively.

t-statistics are in brackets below each coefficient estimate.

The table presents time-series weighted least squares regression coefficients from the following regression, with weight being the square root of the number of firms in each calendar month:

$$R_{pt} - R_{ft} = a_p + b_p(R_{mt} - R_{ft}) + s_pSMB_t + h_pHML_t + \varepsilon_t$$

where R_{pt} is the equally weighted portfolio returns in calendar month t ; R_{ft} is the 30-day T-bill yield in month t ; R_{mt} is the return on the value-weighted *CRSP* index; SMB_t is the return on small firms minus the return on large firms; and HML_t is the return on high book-to-market stocks minus the return on low book-to-market stocks in month t . Quintiles are formed for each month from May of 1988 to December of 2001 by sorting all sample firms that have issued equity in the previous 12 to 48 months based on DAC_0 .

The t-statistic for $a_p(Q5)-a_p(Q1)$ in the table is from the intercept in an (unreported) equivalent regression of the difference between the conservative and aggressive portfolio returns on the factor returns.

The estimated difference in intercepts between the conservative and aggressive portfolios and associated t-statistics is obtained from an unreported time-series regression of the difference in returns between the conservative and aggressive portfolios on the factor returns. The calculated abnormal returns differential between the most aggressive and most conservative discretionary accruals portfolios is 0.56 percent per month, implying an annual return differential of 6.72 percent (0.56 percent * 12).

Table 6 also shows the calendar-time portfolio regression results when the issue-year performance-adjusted discretionary accruals ($ADJDAC_{it}$) is used to determine the portfolio formation. No monotonically declining pattern from Q1 to Q5 is discernable. The statistical and economic significance of the abnormal return differential between the conservative (Q1) and aggressive portfolio (Q5) is further reduced. The two-tailed p-value for the difference in intercepts between the aggressive and conservative earnings management portfolios is 0.40, and the annual abnormal returns differential is 3.6 percent (0.30 percent * 12).

To summarize, even though Section VI shows that there is strong evidence that the issue-year discretionary accruals predict the post-issue deterioration in IPO firms' operating performance measures, there is no strong evidence that discretionary accruals estimated from cash flow statement and post-issue abnormal stock returns are negatively correlated. Performance matching further weakens the statistical and economic significance of the relationship between the two. This lack of intertemporal and methodological robustness diminishes our confidence in TWW and TWR's conclusion that the market is misled by income-increasing accrual management in the IPO year.

VII. TESTS OF IPO PRICING: H2

Hypothesis 2 predicts that both reported earnings and ownership retention should be positively priced by investors in valuing IPO firms. To test this hypothesis, I employ an empirical formulation that is motivated by the model and intuition of Ohlson (1995) and Downes and Heinkel (1982). I posit that the initial market value of equity is a function of net income, the book value of equity, the ownership retention signal, and the total gross proceeds raised during the IPO process.

To set the stage, I first run OLS regressions according to the following empirical formulation:

$$V_i = w_0 + w_1\alpha_i + w_2Gross\ Proceeds_i + w_3Net\ Income_i + w_4Book\ Value_i, \quad (13)$$

where:

V_i = market value of IPO firm i immediately after the offering, calculated as total number of shares outstanding after the offer multiplied by closing price on the first day of trading;

α_i = ownership retention measure as defined in Section V;

$Net\ Income_i$ = IPO firm i 's net income before extraordinary items (#123 from Cash Flow Statement) in year -1 ;

$Book\ Value_i$ = IPO firm i 's book value of equity (#60) in year -1 ; and

$Gross\ Proceeds_i$ = offer price multiplied by total number of primary shares issued.

Only firms with positive pre-offering book values are included in the regression. To mitigate the effect of heteroscedasticity and scale bias, I also use weighted least squares

with weight being the total revenue in year -1 to re-estimate the above empirical formulation. Table 7 shows that the coefficients on *Net Income* and *Ownership Retention* (α) are significantly positive in all regression specifications.

In summary, consistent with H2, for the sample of IPO firms examined here, there is strong evidence that both ownership retention and *Net Income* are significantly positively related to IPO valuation.

VIII. TESTS OF THE TRADE-OFF BETWEEN EARNINGS MANAGEMENT AND OWNERSHIP RETENTION: H3

I test H3 by the following system of equations with discretionary accruals and retained ownership as dependent variables, each modeled as a function of the other signal, the *ex ante* risk measure (*STDRET*), and a set of control variables. More specifically, for the regression of ownership retention:

TABLE 7
Tests of IPO Pricing

Variables	Market Value: V_i			
	Ordinary Least Squares		Weighted Least Squares	
	Coefficient	Coefficient	Coefficient	Coefficient
Intercept	-151.250*** [-6.20]	-312.230*** [-15.69]	-423.479*** [-13.00]	-648.557*** [-98.92]
α	380.740*** [10.71]	469.090*** [16.52]	905.891*** [20.07]	1710.071*** [28.46]
<i>Net Income</i>	1.850*** [9.32]	1.354*** [4.28]	1.960*** [7.24]	1.480*** [7.41]
<i>Book Value</i>	2.280*** [27.47]	0.732*** [9.59]	2.168*** [29.44]	0.567*** [8.09]
<i>Gross Proceeds</i>		4.402*** [37.24]		4.442*** [39.38]
Adj. R^2	0.3390	0.6995	0.4920	0.7451
Prob(F)	<0.0001	<0.0001	<0.0001	<0.0001
No. of Obs.	1295	1288	1276	1266

*, **, *** Denote significance at the 10 percent, 5 percent, and 1 percent levels (for a two-sided test), respectively.

t-statistics are in brackets below each coefficient estimate. To reduce the influence of outliers, all variables in the regressions are trimmed at top and bottom 1 percent. I also eliminate from each regression all influential observations meeting one of the following conditions: absolute value of DFFITS greater than 2, absolute value of STUDENT greater than 2, or COOKD greater than 2 (Belsley et al. 1980).

Variable Definitions:

The dependent variable is V_i , which is market value of the IPO firm i immediately after the offering, calculated as total number of shares outstanding after the offer * closing price on the first day of trading.

The independent variables are:

α_i = ownership retention measure as defined in Section V;

Net Income _{i} = IPO firm's net income before extraordinary items (#123, from Cash Flow Statement) in year -1 ;

Book Value _{i} = IPO firm's book value of equity (#60) in year -1 ; and

Gross Proceeds _{i} = offer price * total number of primary shares issued.

Columns 2–3 are results from Ordinary Least Squares. All observations used in the regression have positive book values.

Columns 4–5 are results from Weighted Least Squares, with weight being lagged sales. All observations used in the regression have positive book values and non-missing lagged sales.

$$\begin{aligned} \lg ALPHA = & \alpha_0 + \alpha_1 STDRET + \alpha_2 DAC_0 + \alpha_3 UnderP + \alpha_4 LEV + \alpha_5 CAPEXP_{01} \\ & + \alpha_6 UWrank + \alpha_7 \lg Age + \alpha_8 VCdum + \alpha_9 Hitech + \sum_{i=87}^{96} \alpha_i Yr(i) \\ & + \varepsilon_1, \end{aligned}$$

and for the regression of earnings management regression:

$$\begin{aligned} DAC_0 = & \beta_0 + \beta_1 STDRET + \beta_2 \lg ALPHA + \beta_3 ACCSALES + \beta_4 LEV + \beta_5 CAPEXP_{01} \\ & + \beta_6 UWrank + \beta_7 \lg Age + \beta_8 Auditor + \beta_9 VCdum + \beta_{10} Hitech \\ & + \sum_{i=87}^{96} \beta_i Yr(i) + \varepsilon_2, \end{aligned}$$

where:²⁷

$\lg ALPHA$ = logit transformation of ownership retention α (defined in Section V), i.e., $\lg ALPHA = \log(\alpha/(1 - \alpha))$;²⁸

DAC_0 = discretionary accruals estimated from the Modified Jones model;

$STDRET$ = average standard deviation of daily stock returns of the industry- and size-matched control sample over the year prior to the IPO, as defined in Section V;

$UnderP$ = IPO underpricing, defined as the percentage difference between the offer price and the closing price on the first day of trading;

LEV = IPO firm's leverage ratio at the beginning of the IPO year, which equals 1 minus the ratio of book value of equity (#60) to total assets (#6);

$ACCSALES$ = issue-year total accruals per dollar of sales, where total accruals is measured as $ACC = EBXI$ (#123) – CFO (#308 – #124), as in Section V;

$CAPEXP_{01}$ = average capital expenditure (#128) in year 0 and year 1, scaled by total assets at the beginning of the issue-year (year 0);

$\lg Age$ = $\log(1 + \text{IPO Age})$, where IPO firm age is calculated as the difference between the founding year and IPO issue-year;

$UWrank$ = a ranking of the reputation of the lead underwriter on a 0–9 scale following Carter et al. (1998), 9 being the highest;²⁹

$Auditor$ = indicator variable for auditor reputation, which equals 1 if the auditor is one of the Big 5 (Big 6) auditors;

$VCdum$ = indicator variable that equals 1 if the IPO firm is backed by venture capital (VC); and

$Hitech$ = indicator variable from SDC that equals 1 if the IPO firm is in the high-tech industry, and 0 otherwise.

The key variable of interest in this context is $STDRET$. According to H3, as the risk of the IPO firm increases, it becomes relatively costlier for the risk-averse issuer to retain

²⁷ Compustat data item are included in parentheses.

²⁸ Because the ratio variable α is bounded by 0 and 1 and is highly skewed, logit transformation is used to normalize the distribution.

²⁹ The ranking is obtained from Jay Ritter's website, which is constructed for the 1992–2000 period. When an IPO issuer has multiple lead underwriters, the average ranking is used instead.

shares of the IPO firm, and the issuer will substitute earnings management for ownership retention so as to communicate his private information at minimal cost. To test this cross-sectionally, however, one would have to control for other effects that are not explicitly modeled in the restricted theoretical setting.

Starting with the ownership retention regression, underpricing (*UnderP*) is included as a control variable in the ownership retention regression as prior literature suggests that it is an important determinant of post-IPO ownership structure. For example, Brennan and Franks (1997) argue that issuers underprice their firms at the IPO to induce oversubscription, which allows the firm to discriminate against large blockholders in the allocation of shares. In their theoretical model of IPOs, Grinblatt and Hwang (1989) show that, holding the riskiness of the firm constant, ownership retention and underpricing are positively correlated. Beatty (1989) also empirically confirms a positive and significant relationship between retained ownership and underpricing. According to the pecking-order theory of capital structure (Myers and Majluf 1984), firms prefer internal finance to external finance and debt finance to equity finance. Hence, a high-growth firm may be forced to finance its investment decisions by equity instead of retained earnings or debt. I use the IPO firm's asset-scaled average capital expenditure in year 0 and year 1 ($CAPEXP_{01}$) as a growth proxy and therefore I predict that $CAPEXP_{01}$ should be negatively related with ownership retention. Relatedly, limited debt capacity may motivate the firm to raise more equity through the IPO process. Hence, I predict that IPO firms with higher pre-IPO leverage ratios will have lower post-IPO ownership retention. Underwriter rank (*UWrank*) is included to control for the investment bank's reputation in facilitating shareholders' selling. As VCs might take IPOs as an exit opportunity to realize their stake in the firm, I predict that VC backing is associated with less ownership retention. I also include *lgAge*, a high-tech industry dummy (*Hitech*) and a set of IPO-year dummies to control for systematic differences in firm characteristics and time-period differences.

A somewhat similar set of control variables is included in the earnings management regression. These control variables can be classified into two categories: (1) third-party certification and monitoring, and (2) incentive and opportunities for earnings manipulation. The first category includes auditor and investment banker reputation and a dummy variable indicating the presence of venture capital backing. All other things equal, an auditor and/or investment banker with a lower reputation may be more acquiescent to the issuer's management of earnings. Hochberg (2004) provides evidence that venture capital backing is associated with a reduction in earnings management in the IPO year, suggesting that venture capitalists might play a positive role in governing and monitoring the firm due to their unique expertise and knowledge. I thus predict that the coefficients on the auditor reputation (*Auditor*), the investment banker reputation (*UWrank*) and the VC backing dummy (*VCdum*) are negative. The second category of variables include leverage ratio (*LEV*), total accruals per dollar of sales (*ACCSALES*), average capital expenditure in year 0 and year 1 scaled by total assets at the beginning of year 0 ($CAPEXP_{01}$), and *lgAge*. Leverage ratio (*LEV*) is included to control for the documented tendency of firms to manage earnings upward in order to loosen debt covenant constraints (DeFond and Jiambalvo 1994). The total accruals per dollar of sales in the issue-year (*ACCSALES*) is used as a proxy for the accounting flexibility the IPO issuer has in manipulating earnings. I expect that more accounting flexibility is associated with a higher degree of earnings management. *lgAge* and $CAPEXP_{01}$ are used as proxies for growth. Younger and high-growth firms derive a substantial part of their value from highly uncertain growth opportunities, making it harder for investors to appraise such firms and easier for managers of these firms to mislead

investors.³⁰ I thus expect capital expenditure growth to be positively associated with earnings management and firm age to be negatively associated with earnings management.

To summarize, besides *STDRET*, the control variables that are common to both regressions are: *UWrank*, *VCdum*, *CAPEXP₀₁*, *LEV*, *lgAge*, and a set of IPO-year dummies. Underpricing (*UnderP*) appears only in the ownership retention regression, and *ACCSALES* and auditor reputation (*Auditor*) appear only in the earnings management regression.

It is important to address the simultaneity issue between the two equations since in my model, ownership retention and earnings management are jointly determined in that the strategic mix of the two is chosen to minimize the total signaling cost. Failing to control for such simultaneity in the design of empirical tests leads to biased estimates in both the exogenous, as well as endogenous, variables (Intriligator et al. 1996). Thus, I estimate these two equations by two-stage least squares (2SLS). In this case, *UnderP* is the exogenous variable directly related to ownership retention, and *Auditor* and *ACCSALES* are exogenous variables that are directly related to earnings management. Hence, the two-equation system is fully identified.

Columns 1 and 3 in Table 8 present the first-stage regression of ownership retention and earnings management on all exogenous variables. The adjusted R^2 s are 13.35 percent and 38.82 percent, respectively, both with $\text{prob}(F) < .0001$, indicating that the instruments are jointly significant.

The second-stage regression results are presented in columns 2 and 4. The coefficients on *STDRET* remain significantly negative in the ownership retention regression (two-tailed p -value < 0.02), and significantly positive in the earnings management regression (two-tailed p -value).

Table 9 presents the two-stage least squares regression results using the issue-year performance-adjusted discretionary accruals (*ADJADC₀*). As predicted, the coefficient on *STDRET* is significantly negative in the ownership retention regression (two-tailed p -value < 0.05), and is significantly positive in the earnings management regression (two-tailed p -value < 0.01). Performance matching, however, reduces the R^2 of the second-stage earnings management regression from 38.82 percent to 20.01 percent. The reduction in explanatory power should probably be expected, given that performance matching reduces measurement error in discretionary accruals that correlates with the growth proxies used in the regression, resulting in much less variation in the dependent variable *ADJADC₀* being explained. In the earnings management regression, the variables intended to capture the incentives and constraints of aggressive accounting, *ACCSALES*, *LEV*, *CAPEXP₀₁*, and *lgAge*, all have the expected signs, but only *ACCSALES* and *LEV* are statistically significant. The third-party monitoring and certification variables, *UWrank* and *VCdum* have the expected signs but are statistically insignificant at conventional levels. Inconsistent with the prediction, the coefficient on the auditor dummy (*Auditor*) is positive, but is statistically insignificant. In the ownership retention regression, all variables have expected signs except *UWrank*, which is significantly positive.

In summary, I interpret the above results as generally consistent with the hypothesis that riskier firms will resort more to earnings management and retain less ownership to achieve separation in the signaling equilibrium.

³⁰ Beneish (1999) also reports that fast-growing firms have strong incentives to manipulate financial statements to allay the perception of growth deceleration.

TABLE 8
Two-Stage Least Squares Regression with DAC_0

Variable	lgALPHA		DAC_0	
	First Stage	Second Stage	First Stage	Second Stage
Intercept	0.888*** [7.07]	? α_0 0.890*** [7.07]	0.062 [1.53]	? β_0 0.071* [1.64]
STDRET	-4.340*** [-2.62]	- α_1 -4.493** [-2.53]	1.295** [2.42]	+ β_1 1.410** [2.51]
DAC_0		? α_2 -0.251** [-2.24]		
lgALPHA				? β_2 -0.013 [-1.24]
UNDERP	0.381*** [4.21]	+ α_3 0.179** [2.31]	-0.025 [-0.85]	
ACCSALES	-0.086* [-1.67]		0.348*** [22.82]	+ β_3 0.508*** [22.98]
LEV	-0.039* [-1.78]	- α_4 -0.049** [-2.45]	0.016 [0.36]	+ β_4 0.021*** [2.66]
CAPEXP ₀₁	-0.001 [-0.94]	- α_5 -0.590*** [-7.34]	0.001*** [0.28]	+ β_5 0.003 [0.66]
UW Rank	0.022*** [2.98]	- α_6 0.036*** [2.13]	-0.008*** [-3.46]	- β_6 -0.006*** [-2.58]
lgAge	-0.046*** [-2.58]	? α_7 -0.047** [-2.46]	-0.001 [-0.16]	- β_7 -0.007 [-1.07]
Dummy: Auditor	-0.044 [-0.70]		0.003 [0.15]	- β_8 -0.003 [-0.13]
Dummy: VC backed	-0.064** [-1.85]	- α_8 -0.055** [-2.17]	-0.011 [-1.05]	- β_9 -0.012 [-0.99]
Dummy: Hitech	0.180*** [5.11]	? α_9 0.127*** [4.02]	0.005 [0.47]	? β_{10} 0.000 [0.03]
Year Dummies	Included	Included	Included	Included
Adjusted R ²	0.1335	0.1574	0.3282	0.3882
Prob(F)	<0.0001	<0.0001	<0.0001	<0.0001
No. of Observations	1098	942	1201	942

*, **, *** Denote significance at the 10 percent, 5 percent, and 1 percent levels (for a two-sided test), respectively.

t-statistics are in brackets below each coefficient estimate.

To reduce the influence of outliers, all variables in the regressions are trimmed at ± 1 percent. Influential observations meeting any of the following conditions are deleted: absolute value of DFFITS greater than 2, absolute value of STUDENT greater than 2, or COOKD greater than 2, per Belsley et al. (1980).

All variables are defined in Section VIII.

VIII. SUMMARY

This paper examines, in a rational expectation framework, how ownership retention and earnings management interact and how they jointly affect the valuation of IPO firms. Analytically, it extends the univariate signaling framework of Leland and Pyle (1977) and derives an *efficient* signaling equilibrium in which both reported earnings and ownership retention are endogenously chosen to convey an IPO issuer's private information. It is shown that even though either ownership retention or reported earnings communicates the issuer's

TABLE 9
Two-Stage Least Squares Regression with $ADJDAC_0$

Variable	$\lg\text{ALPHA}$		$ADJDAC_0$	
	First Stage	Second Stage	First Stage	Second Stage
Intercept	0.888*** [7.07]	? α_0 0.902*** [6.60]	-0.115 [-1.58]	? β_0 -0.177** [-2.31]
<i>STDRET</i>	-4.340*** [-2.62]	- α_1 -4.345** [-2.20]	3.093** [3.14]	+ β_1 3.712*** [3.65]
$ADJDAC_0$		? α_2 -0.033 [-0.56]		
$\lg\text{ALPHA}$				? β_2 -0.003 [-0.19]
<i>UNDERP</i>	0.381*** [4.21]	+ α_3 0.478*** [4.35]	-0.201*** [-3.69]	
<i>ACCSALES</i>	-0.086* [-1.67]		0.572*** [14.74]	+ β_3 0.618*** [13.64]
<i>LEV</i>	-0.039* [-1.78]	- α_4 -0.057** [-1.81]	0.036** [2.34]	+ β_4 0.035** [2.17]
$CAPEXP_{01}$	-0.001 [-0.94]	- α_5 -0.317 [-1.41]	0.010 [0.88]	+ β_5 0.008 [0.73]
<i>UW Rank</i>	0.022*** [2.98]	- α_6 0.021*** [2.57]	0.001 [0.34]	- β_6 0.003 [0.66]
$\lg\text{Age}$	-0.046*** [-2.58]	? α_7 -0.055** [-2.79]	-0.007 [-0.69]	- β_7 -0.009 [-0.87]
Dummy: <i>Auditor</i>	-0.044 [-0.70]		0.033 [0.90]	- β_8 0.041 [1.15]
Dummy: <i>VC backed</i>	-0.064** [-1.85]	- α_8 -0.080** [-2.07]	-0.015 [-0.78]	- β_9 -0.020 [-0.98]
Dummy: <i>Hitech</i>	0.180*** [5.11]	? α_9 0.150*** [3.78]	-0.016 [-0.84]	? β_{10} -0.029 [-1.40]
Year Dummies	Included	Included	Included	Included
Adjusted R^2	0.1335	0.1624	0.1936	0.2001
Prob(F)	<0.0001	<0.0001	<0.0001	<0.0001
No. of Observations	1098	883	1201	883

*, **, *** Denote significance at the 10 percent, 5 percent, and 1 percent levels (for a two-sided test), respectively.

t-statistics are in brackets below each coefficient estimate.

To reduce the influence of outliers, all variables in the regressions are trimmed at ± 1 percent. Influential observations meeting any of the following conditions are deleted: absolute value of DFFITS greater than 2, absolute value of STUDENT greater than 2, or COOKD greater than 1, per Belsley et al. (1980).

All variables are defined in Section VIII.

type to the market unambiguously, the issuer will strategically employ both signals to achieve separation at minimal cost. Comparative statics analysis also shows that the trade-off between earnings management and ownership retention depends critically on the uncertainty over future earnings. The theoretical analysis generates a rich set of empirical implications regarding earnings management, market efficiency, and IPO pricing. Through systematic econometric analysis, I confirm the major predictions of the model.

This paper seeks to make the following contributions to the literature: First, it proposes a non-opportunistic motive for earnings management around corporate events, and challenges the traditional view that earnings management during the IPO period is synonymous with managerial opportunism. Second, by examining how ownership retention and accounting information are priced during the IPO process, it sheds some light on the valuation of IPO firms. Third, by re-examining the evidence presented in TWW and TWR using a different IPO sample and a better measure of accruals, this study provides new evidence regarding efficiency of the IPO market and suggests that care must be exercised in interpreting results in prior studies.

APPENDIX

Proof of Proposition 1

Since the identities of each type of issuers are fully revealed in a separating equilibrium, θ^L has nothing to gain by bearing risk because there is no worse type to separate from. Hence we must have $\alpha^L = 0$. To determine the strategy of θ^H , we need to find the equity fraction that θ^H issuer must retain in order to deter θ^L issuer from mimicking him. In other words, we need to find the values of that satisfy the following incentive constraint:

$$\alpha\theta^L + (1 - \alpha)\theta^H - \frac{b}{2}\alpha^2\sigma^2 \leq \theta^L.$$

In the unique separating equilibrium that is Pareto-dominating, the optimal ownership retention for θ^H is the smallest α that satisfies the above inequality, i.e.:

$$\alpha^H = \frac{\sqrt{(\theta^H - \theta^L)(\theta^H - \theta^L + 2b\sigma^2)} - \theta^H + \theta^L}{b\sigma^2}$$

Proof of Proposition 2

- 1) obvious.
- 2) When $\alpha \geq \alpha^*$, *truthful reporting constitutes an equilibrium*.

To show this, I check whether given the market's beliefs, θ^L has no incentive to pretend that he is θ^H . The benefit for θ^L to report e^H is that for the $(1 - \alpha)$ share of the firm sold, he would be valued as θ^H instead of θ^L , and get an increase in cash receipts of $(1 - \alpha)(\theta^H - \theta^L)$. The cost for θ^L to report e^H is that for the α share of the firm he retains, the value of the firm decreases by the cost of such manipulation, $\alpha C(e^H - e^L)$. Hence, θ^L would not want to pretend to be θ^H by reporting $r^H = e^H$ if $\alpha C(e^H - e^L) > (1 - \alpha)(\theta^H - \theta^L)$, or equivalently, $\alpha > \alpha^*$. In other words, there is a "costless," perfectly informative equilibrium when $\alpha \geq \alpha^*$.

- 3) When $\alpha < \alpha^*$, *there exists a fully separating equilibrium in which θ^H reports $r^H(\alpha) > e^H$, and the low-type truthfully reports $r^L = e^L$.*

Define $r^H(\alpha)$ as such so that $\alpha C(r^H(\alpha) - e^L) = (1 - \alpha)[\theta^H - C(r^H(\alpha) - w^H) - \theta^L]$.

To show that there indeed exists such an equilibrium, I again check whether the low-type has an incentive to mimic the high-type by reporting r^H . The cost of mimicking the high-type's earnings report is $\alpha C(r^H(\alpha) - e^L)$ since for the α share of the firm retained, the

firm value decreases by $C(r^H - e^L)$. The benefit of mimicking the high-type's earnings report is $(1 - \alpha)[\theta^H - C(r^H(\alpha) - e^H) - \theta^L]$ since for the $(1 - \alpha)$ shares of the firm sold, the IPO firm is valued as $\theta^H - C(r^H - e^H)$ instead of θ^L . Thus, by over-reporting to $r^H = r^H(\alpha)$ so that $\alpha C(r^H - e^H) = (1 - \alpha)[\theta^H - C(r^H - e^H) - \theta^L]$, θ^H deters θ^L from mimicking his earnings report. Notice that given $\alpha < \alpha^*$, to make the equality hold, r^H must be greater than e^H and the market's rational valuation of the high-type firm, $\theta^H - C(r^H - e^H)$, must be greater than θ^L . Further, such r^H is decreasing in α as after rearranging the terms, the equality becomes $C(r^H - e^H) + \frac{\alpha}{1 - \alpha} C(r^H - e^L) = \theta^H - \theta^L$. Then as α decreases, r^H must increase to make the equality hold.

4) *There is no pooling equilibrium that satisfies Cho-Kreps Intuitive Criterion.*

A *Pooling (Perfect Bayesian) Equilibrium* is defined as follows:

- Issuer's strategy: $r^H = r^L = e^H$
- Market's belief: Upon observing $r = e^H$, the market believes that the issuer is θ^L with probability π and is θ^H with probability $(1 - \pi)$. Then the IPO price would be $P^p(e^H) = \pi[\theta^L - C(e^H, \theta^L)] + (1 - \pi)\theta^H$ and I am free to specify the off-equilibrium-path beliefs such that this indeed constitutes an equilibrium.

To check whether the pooling equilibrium survives the *Cho-Kreps Intuitive Criterion*, I need to show the following:

First, I show that there exists a $r^* > e^H$ such that the following is true:

$$\begin{aligned} (1 - \alpha)[\theta^H - C(r^* - e^H)] + \alpha[\theta^L - C(r^* - e^L)] \\ = (1 - \alpha)P^p(e^H) + \alpha[\theta^L - C(e^H - e^L)] \end{aligned} \quad (A-1)$$

Notice that the left-hand side is the payoff to θ^L if he deviates from the equilibrium path by reporting $r^* > e^H$ and the market believes that he is θ^H . The right-hand side is the payoff to θ^L by staying on the equilibrium path, i.e., reporting e^H and being pooled with θ^H . When $r^* = e^H$, the left-hand side becomes $(1 - \alpha)\theta^H + \alpha[\theta^L - C(e^H - e^L)]$. It immediately follows that the left-hand side is greater than the right-hand side since $\theta^H > P^p(e^H)$. Increasing r^* above e^H would decrease the left-hand side. Given that C is increasing in r , there exists a $r^* > e^H$ such that (A-1) holds.

Second, I show that for such r^* that satisfies (A-2), the following holds:

$$\theta^H - C(r^* - e^H) \geq (1 - \alpha)P^p(e^H) + \alpha\theta^H. \quad (A-2)$$

Notice that the left-hand side of (A-2) is the payoff to θ^H if he deviates to report r^* and the market believes that he is θ^H . The right-hand side of (A-2) is the payoff to θ^H if he stays on the equilibrium path and is pooled with θ^L .

Subtracting (A-1) from both sides of (A-2) and rearranging terms, I have $C(r^* - e^L) - C(r^* - e^H) \geq C(e^H - e^L)$. Since $C'' > 0$, the above equality holds for any $r^* > e^H$, so the r^* that satisfies (A-1) also satisfies (A-2). Thus, the pooling equilibrium does not survive the *Cho-Kreps Intuitive Criterion* because θ^H could make the following statement:

I am θ^H . To prove this, I am reporting my current earnings as $r^* > e^H$. Notice that if I am θ^L , I would never want to do this because even if you believe that I am θ^H , I would be strictly worse off than staying on the equilibrium path (reporting e^H and pooled with θ^H). But if you believe that I am indeed θ^H , then I would be better off than staying on the pooling equilibrium path, so you should believe that I am θ^H .

Proof of Proposition 3

Let λ denote the non-negative multiplier of the non-mimicry constraint in (6) and μ denote the non-negative multiplier of the $\alpha \geq 0$ constraint.

Notice that the first-order conditions of θ^H 's constrained optimization problem can be written as:

$$C_r^H - \lambda[\alpha C_r^L + (1 - \alpha)C_r^H] = 0; \quad (\text{A-3})$$

$$-b\alpha\sigma^2 - \lambda[\theta^L - C^L(r) - \theta^H + C^H(r) - b\alpha\sigma^2] + \mu = 0. \quad (\text{A-4})$$

If, for θ^H , the optimum under perfect information, $\alpha = 0$ and $r = e^H$ had satisfied the non-mimicry constraint, then $\alpha = 0$, $r = e^H$ would have been the signaling choices of firm H, and the resulting efficient signaling equilibrium would have entailed no welfare loss due to signaling; it would have been a costless signaling equilibrium. However, $(0, e^H)$ violates the non-mimicry constraint as $\theta^H > \theta^L$. Further, as $\alpha = 0$ yields the earnings report uninformative because the issuer does not bear any of the costs associated with over-reporting earnings, in the optimal solution, α must be greater than 0. By the Kuhn-Tucker condition and by complementary slackness, $\mu\alpha = 0$, so we must have $\mu = 0$ in the optimization problem.

Next, since $\alpha > 0$, $\theta^L - C^L(r) - \theta^H + C^H(r) - b\alpha\sigma^2 < 0$. It follows that $\lambda > 0$ in order to satisfy (A-4). From (A-3), $\lambda = \frac{C_r^H}{\alpha C_r^L + (1 - \alpha)C_r^H}$. Notice that if $r = e^H$, then $C_r^H = 0$ and $\lambda = 0$, so it must be that $C_r^H > 0$, i.e., $r > e^H$. In summary, even though either α or r could communicate the issuer's type to the market unambiguously (as discussed in Section III), in the efficient signaling equilibrium, the higher value issuer will strategically employ both signals to achieve separation at minimal cost.

Proof of Proposition 4

Combining (A-3) and (A-4), I obtain:

$$\lambda = \frac{C_r^H}{\alpha C_r^L + (1 - \alpha)C_r^H} = \frac{b\alpha\sigma^2}{-\theta^L + C^L(r) + \theta^H - C^H(r) + b\alpha\sigma^2}. \quad (\text{A-5})$$

As $\lambda > 0$, the non-mimicry constraint is binding, so we must also have:

$$\alpha[\theta^L - C^L(r)] + (1 - \alpha)[\theta^H - C^H(r)] - \frac{b}{2}\alpha^2\sigma^2 = \theta^L. \quad (\text{A-6})$$

After rearranging, I obtain the following two equations:

$$C_r^H[\theta^H - \theta^L + C^L(r) - C^H(r)] - b\alpha^2\sigma^2(C_r^L - C_r^H) = 0; \quad (\text{A-7})$$

$$\alpha[\theta^L - C^L(r)] + (1 - \alpha)[\theta^H - C^H(r)] - \frac{b}{2}\alpha^2\sigma^2 - \theta^L = 0. \quad (\text{A-8})$$

Notice that (A-7) is derived from the necessary conditions for the minimization of total signaling costs—the marginal rate of substitution of each signal must be equalized, whereas (A-8) is the “non-mimicry” condition.

Let:

$$F^1 = C^H_r[\theta^H - \theta^L + C^L(r) - C^H(r)] - b\alpha^2\sigma^2(C^L_r - C^H_r); \quad (\text{A-9})$$

$$F^2 = \alpha[\theta^L - C^L(r)] + (1 - \alpha)[\theta^H - C^H(r)] - \frac{b}{2}\alpha^2\sigma^2 - \theta^L. \quad (\text{A-10})$$

Then $\frac{\partial \alpha}{\partial \sigma^2}, \frac{\partial r}{\partial \sigma^2}$ must satisfy the system of equations:

$$F^1_\alpha \frac{\partial \alpha}{\partial \sigma^2} + F^1_r \frac{\partial r}{\partial \sigma^2} + F^1_{\sigma^2} = 0; \quad (\text{A-11})$$

$$F^2_\alpha \frac{\partial \alpha}{\partial \sigma^2} + F^2_r \frac{\partial r}{\partial \sigma^2} + F^2_{\sigma^2} = 0. \quad (\text{A-12})$$

Differentiating the above F^1 and F^2 with respect to α , r , and σ^2 , I obtain:

$$F^1_\alpha = -2(C^L_r - C^H_r)b\sigma^2\alpha < 0; \quad (\text{A-13})$$

$$F^1_r = (\theta^H - \theta^L + C^L - C^H)C^H_{rr} + C^H_r(C^L_r - C^H_r) - (C^L_r - C^H_r)b\alpha^2\sigma^2 > 0;^{31} \quad (\text{A-14})$$

$$F^1_{\sigma^2} = -(C^L_r - C^H_r)b\alpha^2 < 0; \quad (\text{A-15})$$

$$F^2_\alpha = (\theta^L - C^L(r) - \theta^H + C^H(r)) - b\alpha\sigma^2 < 0; \quad (\text{A-16})$$

$$F^2_r = -(\alpha C^L_r + (1 - \alpha)C^H_r) < 0; \quad (\text{A-17})$$

$$F^2_{\sigma^2} = -\frac{b}{2}\alpha^2 < 0. \quad (\text{A-18})$$

By Cramer's rule, I have:

$$\alpha'(\sigma^2) = \frac{F^1_r F^2_{\sigma^2} - F^2_r F^1_{\sigma^2}}{F^1_\alpha F^2_r - F^1_r F^2_\alpha}; \quad (\text{A-19})$$

$$r'(\sigma^2) = \frac{F^2_\alpha F^1_{\sigma^2} - F^1_\alpha F^2_{\sigma^2}}{F^1_\alpha F^2_r - F^1_r F^2_\alpha}. \quad (\text{A-20})$$

It is obvious that $F^1_r F^2_{\sigma^2} - F^2_r F^1_{\sigma^2} < 0$ and, $F^1_\alpha F^2_r - F^1_r F^2_\alpha > 0$ given the signs of the individual components. After simplification, $F^2_\alpha F^1_{\sigma^2} - F^1_\alpha F^2_{\sigma^2}$ equals $b\alpha^2(C^H_r - C^L_r)[\theta^L$

³¹ By the convexity of C , it immediately follows that $(\theta^H - \theta^L + C^L - C^H)C^H_{rr} + C^H_r(C^L_r - C^H_r) > 0$. When $C'' \geq 0$, $C^L_{rr} \leq C^H_{rr}$. Thus, $F^1_r > 0$.

$-C^L(r) - \theta^H + C^H(r)]$, which is greater than 0 since $C_r^H < C_r^L$ and $\theta^L < \theta^H$. Thus, $\alpha'(\sigma^2) < 0$ and $r'(\sigma^2) > 0$.

REFERENCES

- Barber, B. M., and J. D. Lyon. 1996. Detecting abnormal operating performance: The empirical power and specification of test statistics. *Journal of Financial Economics* 41 (July): 359–399.
- , and ———. 1997. Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics* 43 (March): 341–372.
- Beatty, R. 1989. Auditor reputation and the pricing of initial public offerings. *The Accounting Review* 64 (October): 693–709.
- Belsley, D., E. Kuh, and R. Welsch. 1980. *Regression Diagnostics*. New York, NY: John Wiley & Sons Inc.
- Beneish, M. D. 1999. The detection of earnings manipulation. Working paper, Indiana University.
- Brennan, M., and J. Franks. 1997. Underpricing, ownership and control in initial public offerings of equity securities in the UK. *Journal of Financial Economics* 45 (September): 391–413.
- Carter, R. B., F. H. Dark, and A. K. Singh. 1998. Underwriter reputation, initial returns, and the long-run performance of IPO stocks. *Journal of Finance* 53 (February): 285–311.
- Cho, I. K., and D. M. Kreps. 1987. Signaling games and stable equilibria. *The Quarterly Journal of Economics* 102 (May): 179–222.
- Collins, D. W., and P. Hribar. 2002. Errors in estimating accruals: Implications for empirical research. *Journal of Accounting Research* 40 (March): 105–135.
- Copley, P. A., and E. B. Douthett. 2002. The association between auditor choice, ownership retained, and earnings disclosure by firms making initial public offerings. *Contemporary Accounting Research* 19 (Spring): 49–76.
- Datar, S. M., G. A. Feltham, and J. S. Hughes. 1991. The role of audits and audit quality in valuing new issues. *Journal of Accounting and Economics* 14 (March): 3–49.
- Dechow, P. M., R. G. Sloan, and A. P. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70 (April): 193–225.
- DeFond, M., and J. Jiambalvo. 1994. Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics* 17 (January): 145–176.
- Downes, D. H., and R. Heinkel. 1982. Signaling and the valuation of unseasoned new issues. *Journal of Finance* 37 (March): 1–10.
- Engers, M. 1987. Signalling with many signals. *Econometrica* 55 (May): 663–674.
- Fama, E. F., and K. R. French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33 (February): 3–56.
- . 1998. Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics* 49 (September): 283–306.
- Feltham, G. A., J. S. Hughes, and D. A. Simunic. 1991. Empirical assessment of the impact of auditor quality on the valuation of new issues. *Journal of Accounting and Economics* 14 (December): 375–399.
- Field, L., and M. Lowry. 2004. How is institutional investment in initial public offerings related to the long-run performance of these firms? Working paper, The Pennsylvania State University.
- Franks, J., R. Harris, and S. Titman. 1991. Postmerger share-price performance of acquiring firms. *Journal of Financial Economics* 29 (March): 81–96.
- Grinblatt, M., and C. Y. Hwang. 1989. Signalling and the pricing of new issues. *Journal of Finance* 44 (June): 393–420.
- Hochberg, Y. 2004. Venture capital and corporate governance in the newly public firm. Working paper, University of Rochester.
- Hughes, P. J. 1986. Signalling by direct disclosure under asymmetric information. *Journal of Accounting and Economics* 8 (June): 119–142.

- Intriligator, M., R. G. Bodkin, and C. Hsiao. 1996. *Econometric Models, Techniques, and Applications*. Upper Saddle River, NJ: Prentice Hall.
- Jain, P. C., and O. Kini. 1994. The post-issue operating performance of IPO firms. *Journal of Finance* 49 (December): 1699–1726.
- John, K., and B. Mishra. 1990. Information content of insider trading around corporate announcements: The case of capital expenditures. *Journal of Finance* 45 (July): 835–855.
- Kothari, S. P., and J. B. Warner. 1997. Measuring long-horizon security price performance. *Journal of Financial Economics* 43 (March): 301–339.
- , A. J. Leone, and C. E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39 (February): 163–197.
- Leland, H. E., and D. H. Pyle. 1977. Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance* 32 (May): 371–387.
- Loughran, T., and J. Ritter. 1995. The new issues puzzle. *Journal of Finance* 50 (March): 23–52.
- Lowry, M., and S. Shu. 2002. Litigation risk and IPO underpricing. *Journal of Financial Economics* 65 (September): 309–335.
- McNichols, M., and G. P. Wilson. 1988. Evidence of earnings management from the provision for bad debts. *Journal of Accounting Research* 26 (Supplement): 1–31.
- . 2000. Research design issues in earnings management studies. *Journal of Accounting and Public Policy* 19 (September): 313–345.
- Milgrom, P., and J. Roberts. 1986. Price and advertising signals of product quality. *Journal of Political Economy* 94 (August): 796–821.
- Myers, S. C., and N. S. Majluf. 1984. Corporate financing and investment decisions when firms have information investors do not have. *Journal of Financial Economics* 13 (June): 187–221.
- Ohlson, J. 1995. Earnings, book value and dividends in security valuation. *Contemporary Accounting Research* 11: 661–687.
- Rangan, S. 1998. Earnings management and the performance of seasoned equity offerings. *Journal of Financial Economics* 50 (October): 101–122.
- Riley, J. G. 1975. Competitive signalling. *Journal of Economic Theory* 10 (April): 174–186.
- Ritter, J. R. 1991. The long-run performance of initial public offerings. *Journal of Finance* 46 (March): 3–27.
- , and I. Welch. 2002. A review of IPO activity, pricing, and allocations. *Journal of Finance* 57 (August): 1795–1828.
- Shivakumar, L. 2000. Do firms mislead investors by overstating earnings before seasoned equity offerings? *Journal of Accounting and Economics* 29 (June): 339–371.
- Shumway, T. 1997. The delisting bias in CRSP data. *Journal of Finance* 52 (March): 327–340.
- , and V. A. Warther. 1999. The delisting bias in CRSP's NASDAQ data and its implications for the size effect. *Journal of Finance* 54 (December): 2361–2379.
- Simunic, D., and M. Stein. 1987. *Product Differentiation in Auditing: Auditor Choice in the Market for Unseasoned New Issues*. Research Monograph Number 13. Vancouver, Canada: The Canadian Certified General Accountants Research Foundation.
- Spence, M. 1973. Job market signaling. *The Quarterly Journal of Economics* 87 (August): 355–374.
- Stein, J. C. 1989. Efficient capital markets, inefficient firms: A model of myopic corporate behavior. *The Quarterly Journal of Economics* 104 (November): 655–669.
- Teoh, S. H., I. Welch, and T. Wong. 1998. Earnings management and the long-run market performance of initial public offerings. *Journal of Finance* 53 (December): 1935–1974.
- Teoh, S. H., T. J. Wong, and G. R. Rao. 1998. Are accruals during initial public offerings opportunistic? *Review of Accounting Studies* 3 (May): 175–208.
- Viswanathan, S. 1987. A multiple signalling model of corporate financial policy. Unpublished dissertation, Northwestern University.

Measuring Reporting Conservatism

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ABSTRACT: The paper examines the power and reliability of the differential timeliness (DT) measure developed by Basu (1997) to gauge reporting conservatism. We identify certain characteristics of the information environment unrelated to conservatism that affect the DT measure and find that it is sensitive to the degree of uniformity in the content of the news during the examined period, the types of events occurring in the period, and firms' disclosure policies. Our tests, based on both actual and simulated data, indicate that assessing the extent of reporting conservatism using this measure requires the recognition of, and control for, these characteristics. We also find that the difference in the timeliness of reporting bad versus good news is likely to be more pronounced than previously reported. Further, we provide additional evidence on the negative association between the DT measure and alternative aspects of conservatism, suggesting that the exclusive reliance on any single measure to assess the overall conservatism of a reporting regime (firms, countries, or time periods) is likely to lead to incorrect inferences.

Keywords: *conservatism; asymmetric timeliness; financial disclosures; quality of earnings; earnings management; accruals.*

I. INTRODUCTION

Accountants, regulators, and academicians have long struggled with the need to operationalize qualitative properties of financial reporting systems such as objectivity, reliability, consistency, comparability, and materiality. Indeed, some attempts have been made to quantify the attributes of materiality (Cho et al. 2003; Pany and Wheeler 1989), reliability (Barth and Clinch 1998; Entwistle and Phillips 2003), and comparability or heterogeneity (DeFond and Hung 2003).

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With some exceptions such as Hagerman and Zmijewski (1979, 1981), Staubus (1985), and Leftwich (1995), little attempt has been made over the years to quantify conservatism, even though it is one of the most prominent characteristics of financial accounting. One measure of conservatism that emanates from the work of Feltham and Ohlson (1995) is the expected market-to-book ratio. This ratio has been used to gauge changes in reporting conservatism over time (e.g., Ahmed et al. 2000; Beaver and Ryan 2000; Givoly and Hayn 2000; Stober 1996) and, coupled with other financial ratios, to measure conservatism across countries (e.g., Joos and Lang 1994).

Basu (1997) introduced a number of measures that capture the essence of the conservatism principle as reflected in the adage “anticipate no profits but anticipate all losses.” That is, conservative reporting means that events with an expected unfavorable outcome are recognized promptly in income, whereas the recognition of the effects of expected favorable events is deferred. Basu’s (1997) most commonly used measure relates to the speed of response of accounting earnings to bad news relative to good news where the news content is determined by the sign of the period’s return. This measure has been used in numerous studies to assess the extent of accounting conservatism. These include studies dealing with the variation of conservatism across firms (Basu 1997; Kwon 2002; Huijgen and Lubberink 2005; Chandra et al. 2004), changes in conservatism across time periods (Basu 1997; Givoly and Hayn 2000; Holthausen and Watts 2001; Raonic et al. 2004; Sivakumar and Waymire 2003), its variability over quarters (Basu et al. 2001a), its relation to the audit work and auditors’ exposure to legal liability (Basu 1997; Basu et al. 2001b; Krishnan 2003, 2005; Gul et al. 2002; Ruddock et al. 2004; Chaney and Philipich 2003; Kelley et al. 2004), its impact on the cost of equity (Francis et al. 2004), its relation to the composition of the board of directors (Beekes et al. 2004), its cross-country variation (Ball et al. 2000; Ball et al. 2003; Bushman and Piotroski 2006; Cao and Lee 2002; Giner and Rees 2001; Jindrichovska and Kuo 2003; Peek et al. 2004; Pope and Walker 1999; Tazawa 2003), and the trend in the information content of accounting numbers (Ryan and Zarowin 2003). For a comprehensive analysis of the causes for conservatism and an extensive review of the related research see Watts (2003a, 2003b).

Given the widespread use of Basu’s (1997) measure of differential timeliness to gauge conservatism, a critical evaluation of the measure is in order. In a recent study, Dietrich et al. (2006) (hereafter, DMR) question the validity of the reverse regression model to measure conservatism from an econometric perspective. They argue that because the firm’s return is an endogenous variable, the use of the return as an independent variable in the reverse regression proposed by Basu (1997) renders the results non-interpretable. Also, because the return is truncated, DMR argue that the assessed level of conservatism is biased. In this paper, we assume that the model is valid and investigate the power and reliability of the differential timeliness (hereafter, DT) measure to gauge the degree of reporting conservatism. Our analyses relating to the influence of information environment factors on the DT measure (provided in Section V) are independent of the claims made by DMR.¹

We identify characteristics of the firm’s information environment that affect the DT measure, yet are unrelated to reporting conservatism. The effect of these characteristics on the DT measure is examined using both simulated and actual data. We then provide evidence suggesting that in many settings, the DT measure suffers from serious measurement errors. Our conclusion is that inferences regarding the variation of conservatism across

¹ In fact, while the bias identified by DMR has the effect of creating the appearance of conservatism when it is unlikely to exist (e.g., in the series of cash flows), the aggregation effect that we identify (discussed in Section V) results in a *downward* bias in the DT measure.

firms, time periods, countries, or reporting regimes cannot be reliably made based on the DT measure without controlling for certain characteristics of the information and disclosure environments of the compared samples. Such controls, however, are not easy to implement.

Finally, we discuss the association between the DT measure and other dimensions and measures of conservatism. We provide additional evidence to that of previous studies showing that this association is negative, which suggests that the DT measure and, more generally, any single measure of conservatism, is insufficient to assess all dimensions of conservatism in the sample of interest. We further propose that within the framework of current U.S. GAAP, other dimensions of conservatism are more subject to discretion by management and standard setters, making them potentially more insightful than the DT measure in studying the reporting choices and standards development in different reporting regimes.

The paper contributes to the literature on accounting conservatism by providing evidence on the power and reliability of the differential timeliness measure that is widely used to gauge conservatism. It further identifies factors that bias or otherwise increase the estimation noise of this measure, alerting researchers to circumstances where the measure is most likely to yield biased inferences regarding the degree of conservatism.

The paper proceeds as follows. In the next section, we provide a definition of conservatism and discuss reporting features that result in conservative reporting. Section III contains a brief description of the differential timeliness measure. The sample and data used in the various tests are described in Section IV. In Section V, we discuss information characteristics hypothesized to cause measurement error in the DT measure, test for their presence, and examine their influence on the DT measure. Section VI provides evidence on anomalous behavior of the DT measure, illustrating its sensitivity to the identified information characteristics. Section VII contains a discussion of the various aspects of accounting conservatism and their relation to each other. A summary and concluding remarks are provided in the final section of the paper.

II. DEFINITION AND MEASURES OF REPORTING CONSERVATISM

To put our discussion of the DT measure in perspective, it is useful to define conservative reporting and identify the aspect of conservatism that this measure purports to gauge. Surprisingly, no authoritative definition of conservatism exists, despite its central role in accounting theory and practice.² There is, however, general agreement that a consequence of conservative accounting is the systematic undervaluation of the entity's net assets (equity) relative to their economic value (see Watts 2003a).

Different reporting features may result in asset understatement. One such feature is the selection of "conservative" accounting methods. For example, asset understatement results from the choice to expense investments in certain assets (e.g., R&D) or accelerate the recognition of certain costs (e.g., through use of accelerated depreciation or LIFO). The mirror image of an understatement of net assets on the balance sheet (also known as "balance sheet conservatism") is a corresponding reduction in income ("income statement conservatism"). The balance sheet effect may persist over time as exemplified by the systematic understatement of expensed intangibles. However, the income statement effect is inherently reversible. For example, the capitalization of costs "shields" the current period's earnings from certain expenses. Yet, the capitalized costs will be amortized in future

² The only "official" definition is that offered in the glossary of Statement of Concepts No. 2 of the FASB, namely, that conservatism is "a prudent reaction to uncertainty to try to ensure that uncertainty and risks inherent in business situations are adequately considered." The nature of the "prudent reaction" or how such a "reaction" can ensure that risks are "adequately considered" is not addressed.

periods, raising these periods' expense levels. Likewise, higher depreciation charges under accelerated depreciation in the early periods of an asset's life will be followed by lower depreciation charges in later periods.

A second reporting feature that results in the understatement of net assets is the asymmetric timeliness of recognizing gains and losses. A notable example of this feature is the application of the lower-of-cost-or-market rule that requires that, once established, an impairment in the value of assets be recognized immediately, whereas gains and appreciation must await their realization before being recognized in income.

Both reporting features arise from accountants' predisposition to require a higher degree of verification and certainty for the establishment of assets as compared with liabilities (see Basu 1997; Watts 2003a). The first reporting feature is also referred to in the literature as "unconditional conservatism" and the latter feature as "conditional conservatism." According to Ball and Shivakumar (2005), who introduced these terms, conditional conservatism is more economically important since it increases the efficiency of debt contracting. In contrast, the known bias in the valuation of assets under unconditional conservatism can be corrected by rational users of the financial statements, making a contracting-based demand for a known unconditional bias unlikely. Basu (1997) and the research on conservatism in recent years have indeed focused on measures of conditional conservatism of which the DT measure is the most commonly used. As explained later, the DT measure, the focus of the study, reflects only certain aspects of conservatism. Its relation to other measures that capture somewhat different reporting features associated with conservatism is discussed and analyzed in Section VII.

III. THE DIFFERENTIAL TIMELINESS (DT) MEASURE

Basu (1997) gauges conservatism by the extent to which earnings reflect bad news more quickly than they do good news. In his primary measure of conservatism, the period is characterized as containing "good news" or "bad news" based on the sign of the firm's stock return. This conservatism measure relies on the extent to which the earnings-return association is stronger during periods of bad news (i.e., negative return periods) as compared to periods of good news (i.e., positive return periods). The difference in the timeliness in which news is reflected in returns is captured by β_2 in the regression:

$$EPS_{jt}/Price_{jt-1} = \alpha_0 + \beta_0 * DUM_{jt} + \beta_1 * Return_{jt} + \beta_2 * (DUM_{jt} * Return_{jt}) + \varepsilon_{jt} \quad (1)$$

where j and t denote the firm and period, respectively. *EPS* is the earnings per share from continuing operations and *Return* is the firm's stock return computed, alternatively, over the fiscal year or the 12-month period beginning nine months prior to the end of the fiscal year.³ *DUM* is a dummy variable that receives the value of 1 if the *Return* variable for the period is negative, and 0 otherwise.

Under conservatism, β_2 is positive and measures the incremental response of earnings to bad news over the response to good news. It is equivalent to the difference between the slope coefficient of the following regression of earnings on returns estimated separately for negative return and positive return observations:

³ Unless otherwise indicated, we present results based on raw returns and earnings per share from continuing operations. Replicating the tests using market-adjusted returns instead of raw returns and net income instead of income from continuing operations leaves the results intact.

$$EPS_{jt}/Price_{j,t-1} = \lambda_0 + \delta_1 * Return_{jt} + \varepsilon_{jt} \quad (2)$$

Our tests focus on the extent to which β_2 in Regression (1), the “differential timeliness” measure, captures the degree of accounting conservatism. We also examine a derivative measure obtained from Regression (1), calculated as $(\beta_1 + \beta_2)/\beta_1$. This ratio, which we refer to as the “differential timeliness” ratio, was introduced by Pope and Walker (1999). It reflects the relative timeliness of the firm’s incorporation of bad new relative to good news in earnings.

IV. SAMPLE AND DATA

Most of the empirical analyses in this paper rely on a sample consisting of all firms on Standard & Poor’s Compustat 2001 database (Primary-Supplementary-Tertiary, Full Coverage, and Research files) that have sufficient earnings per share and return data to perform the tests. Earnings data are available annually over the years 1951 to 2001 and quarterly from 1962 to 2001. Returns are obtained from the Center for Research in Security Prices (CRSP) data file.

The initial sample of annual data consists of 14,616 firms and 136,887 firm-years. Following Basu (1997), we eliminate extreme observations of the earnings per share and return distributions every year.⁴ This results in a final sample of 14,383 firms and 131,920 firm-years. A similar elimination of extreme observations from the quarterly data leads to a final quarterly sample consisting of 17,371 firms and 443,605 firm-quarters. The pooled cross-sectional DT measure (β_2 in Regression (1)) of the annual sample is 0.302 and, when estimated from the quarterly time-series of the firms, has a mean (median) value of 0.050 (0.014).

V. SENSITIVITY OF THE DT MEASURE TO FACTORS UNRELATED TO CONSERVATISM

In this section we identify three factors that are not related to reporting conservatism but that, nonetheless, are likely to affect the magnitude of the DT measure. We refer to these factors, which are explained below, as the “aggregation” effect, the “nature of the economic events” effect, and the “disclosure policy” effect. Since they affect the magnitude of the DT measure, these factors have a bearing on the inferences based on this measure about differences in the degree of conservatism across reporting regimes, samples of firms, or time periods.

Below we analyze and test the effect of these factors on the DT measure. In Section VI, we examine the presumed effect of these factors on the power and measurement error of the DT measure.

Aggregation Effect

The notion underlying the DT measure is that conservatism is captured by the differential incremental effect of individual events on current earnings as a function of the nature of the event (good or bad). If the effect of bad economic events is more promptly reflected in earnings than the effect of good economic events, then we would expect the DT measure to be positive. However, individual economic events and their economic impact are not observable, nor is their incremental effect on earnings. What we observe instead are

⁴ Observations at the top and bottom 1.0 percent of the $EPS_t/Price_{t-1}$ and $Return_t$ distributions each year are eliminated. Use of 0.5 percent and 1.5 percent as cut-off points does not alter the results.

aggregate earnings for the period and the *cumulative* economic impact of the period's events as gauged, for example, by the sign of the cumulative stock return over the period. Estimating the earnings-return relation from these aggregate data may not yield the expected positive DT value, even if the underlying reporting behavior is consistent with conservatism. In fact, the (inevitable) use of aggregated data to estimate the DT measure reduces the power of the tests to detect conservatism when it is present. In other words, while accounting may be conservative with respect to individual events, this reporting conservatism may not be captured by the DT measure since it is estimated from aggregate earnings and aggregate returns.

We demonstrate the aggregation effect by using simulated as well as actual data. In the simulation analysis, "economic shocks" (i.e., favorable or unfavorable events) and their associated return and earnings effects are generated in a manner consistent with reporting conservatism. By construction, individual bad news events are reflected in earnings on a timelier basis than are individual good news events. Moving from the realm of single events, we next measure the returns and earnings of multiple-event periods by aggregating over the period both the returns and earnings generated by multiple economic shocks. We then estimate the DT measure from the regression of earnings on returns and examine the sensitivity of the results to the number of events in the period. The simulation procedure is described in Appendix A.

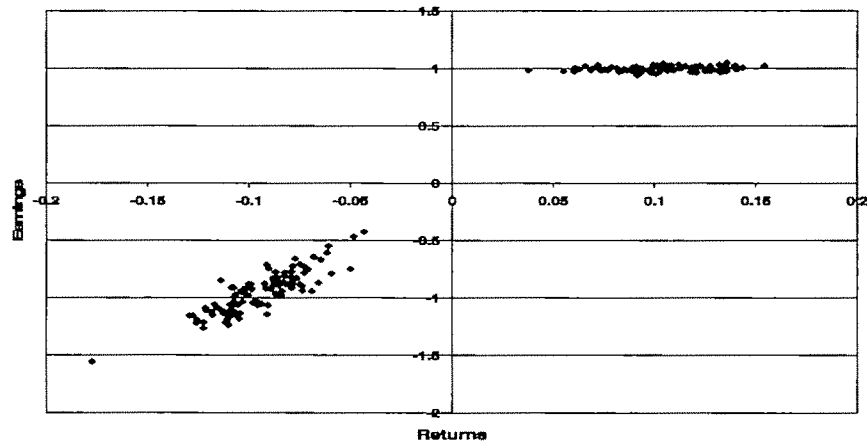
As suggested above, the use of aggregate earnings and the cumulative return for the period to estimate the DT measure obscures the presence of conservatism even when it is present in the data. The intuition underlying this argument is reflected in Figure 1. The three scatter diagrams depict the earnings-return association obtained from the simulation for single-shock, two-shock, and ten-shock periods, respectively. By construction, the sample of single-shock periods exhibits conservatism. That is, earnings and returns are more strongly associated for cases of negative returns than for cases of positive returns. In contrast, when the periods consist of two economic shocks or events and, thus, the period's returns and earnings are the sum of these variables' values over the two events, the differential earnings-return association between negative return and positive return cases disappears.

As seen in Panel B of Figure 1, for approximately half of the two-shock periods (the center cluster of points), the two shocks are in opposite directions representing both a favorable and an unfavorable event. Thus, their effects on earnings partially offset each other, with the stronger shock dominating the period's cumulative earnings and cumulative returns. When the dominant shock is positive (negative), both the return and the earnings for the period as a whole tend to be positive (negative). As a result, the period's earnings and returns are positively correlated in the two-shock periods, independent of the sign of the period's return. This aggregation effect is even more pronounced when more shocks are aggregated as seen in the scatter plot in Figure 1, Panel C.

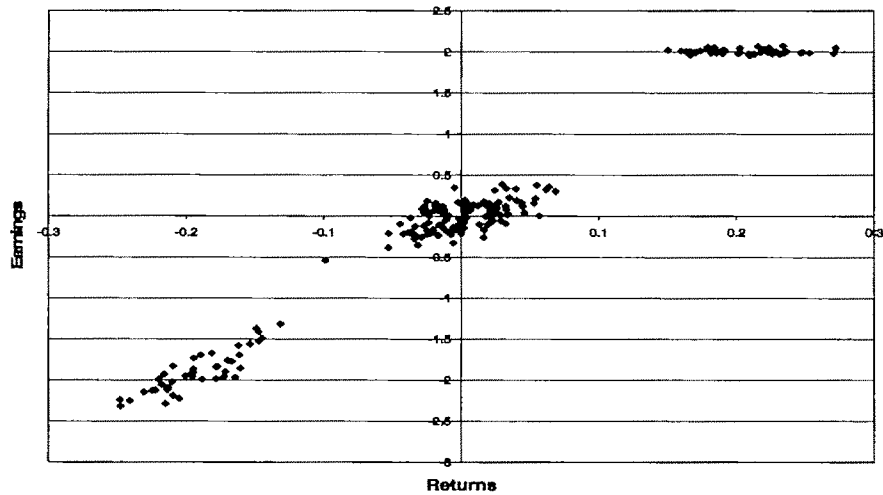
The dampening effect of aggregation on the measured DT is also evident in the cross-sectional estimation of Regression (1) based on the simulation of single-shock and multiple-shock periods described above. Table 1 presents results from this simulation. Consistent with the more timely recognition of bad news to good news built into the simulation, the DT measure estimated on the sample of single-shock periods is positive and significant, correctly indicating conservatism. However, when estimated from aggregated observations, the DT measure plummets from a value of 8.00 when estimated from single-shock observations to values of 0.48, 0.26, and 0.19 when estimated from 2, 10, and 20-shock observations, respectively. The DT ratio suffers a corresponding steep decline as the number of aggregated shocks increases.

FIGURE 1
Simulated Returns and Earnings for Single- and Multiple-Shock Periods*

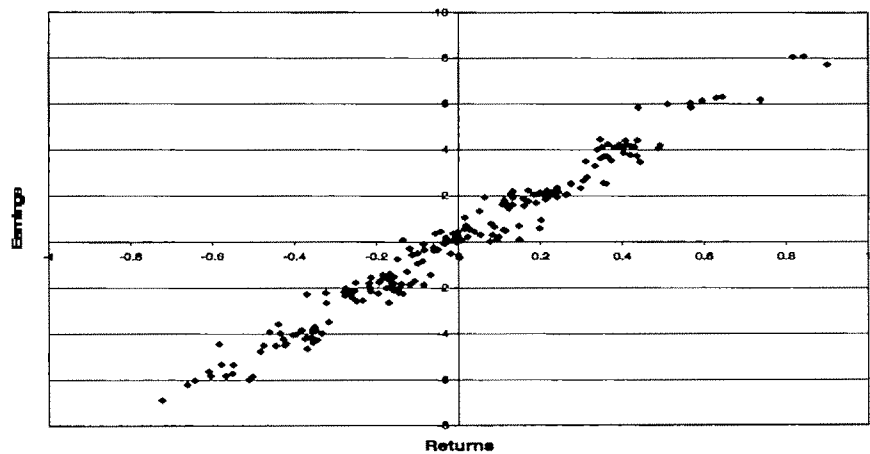
Panel A: Single-Shock Periods (no aggregation)



Panel B: Two-Shock Periods



Panel C: Ten-Shock Periods



* See Appendix A for the details of the simulation.

TABLE 1
Effect of Aggregating Individual Transactions on the Differential Timeliness (DT) Measure:
Estimation of Regression (1) from Simulated "Conservative Reporting" Data^a

Nature of the Economic Events	No. of Economic Events (Shocks) per Period	Coefficient Estimates from Regression (1) ^b		
		Return Coefficient, β_1	DT Measure, β_2	DT Ratio, $(\beta_1 + \beta_2)/\beta_1$
A. All shocks are identically distributed ^c	1	0.00	8.00	> 100
	2	10.06	0.48	1.05
	10	9.66	0.26	1.03
	20	9.63	0.19	1.02
B. Some shocks are more "extreme" ^d	1	0.02	9.34	> 100
	2	8.36	1.99	1.23
	10	8.45	0.92	1.11
	20	9.14	0.64	1.07

^a Appendix A describes the simulation methodology used to produce this table. These results are based on 1,000 simulations of 100,000 observations each.

^b Coefficients reported are from Regression (1):

$EPS_{jt}/Price_{j,t-1} = \alpha_0 + \beta_0 * DUM_{jt} + \beta_1 * Return_{jt} + \beta_2 * (DUM_{jt} * Return_{jt}) + \varepsilon_{jt}$. Mean values are reported in the table; median values are not significantly different from the mean values.

^c Shocks are distributed $N(1,0.2)$ indicating favorable news or $N(-1,0.2)$ indicating unfavorable news with equal probabilities.

^d Ninety percent of the shocks are distributed $N(1,0.2)$ or $N(-1,0.2)$ with equal probabilities. The remaining ten percent of the shocks are "extreme" in that they are distributed $N(10, 2)$ or $N(-10,2)$ with equal probabilities.

Panel B of Table 1 shows the simulation results when the distribution of the shocks is "sprinkled" with extreme shocks (see Appendix A for details). In the presence of extreme shocks, the deterioration in the DT measure as more shocks are aggregated per period becomes more moderate. The reason is that by dominating the period's return and earnings, an extreme shock offsets the aggregation effect, causing a multi-shock period to resemble a single-shock period.

Aggregation Effect in Actual Data

The degree to which the DT measure dissipates upon aggregating the period's events, or shocks, is a function of the extent to which the shocks offset each other. This offsetting feature is, in turn, a product of two characteristics of the information flow. One is the uniformity of the content of the economic shocks during the period. At the extreme, when the period is perfectly homogenous in terms of the content of the shocks (that is, all shocks are "good" or all are "bad"), the fact that the events are aggregated within the period does not affect the resulting DT measure. The second characteristic of the information flow that determines the sensitivity of the DT measure to the aggregation effect is the uniformity of the magnitude of the individual economic shocks. When the magnitude of one or a few shocks in the period dominates the period, the offsetting effect of aggregation is weaker and whatever conservatism characterizes the reporting accounting treatment of individual shocks is still retained even under aggregation.

To test the above predictions regarding the effect of the uniformity of the content and magnitude of the economic shocks during the period on the DT measure, we devise a measure of the extent to which the period is dominated by one-sided shocks either because the period's events are fairly uniform in content or because, even though the shocks are

offsetting, the period's return is still dominated by a single or a few uni-directional price-moving events. This "dominance" measure, *DOM*, is calculated as follows. We divide the period into intervals, each of which is assumed to contain a single shock. Since economic shocks are measured by us (and by the DT measure) through stock returns, the shortest observable interval is one day. Beginning with a one-day interval, we also consider intervals of 5, 10, and 20 days. These different intervals lead to the partitioning of, for example, a quarterly period consisting of, say, 60 trading days into 60 daily intervals, 12 five-day intervals, etc. Let $N(I)$ denote the number of I -day intervals in the period. We then compute the return over each of the N intervals, determine the sign of that return, and accumulate the interval returns separately over the positive and negative return intervals in the period. Denoting the return over the period as *Ret* and the interval accumulation with a total positive or a total negative return as CUM^+ and CUM^- , respectively, we define the dominance measure, *DOM*, for each quarter as the ratio:

$$DOM(I) = |Ret| / \text{Larger of } \{|CUM^+|, |CUM^-|\}. \quad (3)$$

By construction, $DOM(I)$ lies between 0 and 1. In periods where the flow of information has a fairly uniform content (i.e., the events do not offset each other) or, alternatively, one influential event dominates the period dictating the sign of its return, *DOM* will be close to 1. At the other extreme, where the content of the news in the interim periods (as measured by the sign of the return for that interval) is mostly offsetting, *DOM* will be close to 0.⁵

We test the effect of aggregation in actual data by measuring the *DOM* for each firm-quarter. In computing *DOM* we use alternative partitionings of the quarter with interval lengths (I) of 1 day, 5 days, and 10 days. We then rank the firm-quarters by their *DOM* and assign them to three portfolios, from the top third of the observations (those most dominated by same-sign events) to the bottom third of the observations (those least dominated by same-sign events). Finally, we estimate the DT measure across all firm-quarters within each of the three portfolios. We expect the DT measure to be positively related to *DOM*.

The results, reported in Table 2, confirm this expectation. Specifically, the DT measure decreases almost monotonically as the events for the period become more diffuse, as indicated by a lower value of *DOM*. For example, when the returns are cumulated over ten-day intervals as shown in Panel A, the DT measure is 0.246 for the quarters most dominated by same-sign events which are assigned to portfolio 1 (with the relatively high mean *DOM* value of 0.843). The DT measure is much lower and statistically insignificant when estimated for quarters with the least dominant same-sign events contained in portfolio 3 (which has a mean *DOM* value of 0.210 and a DT measure of 0.027). This same pattern is evident

⁵ Note that *DOM* is positively associated with the uniformity of the content of the economic shocks in the period and negatively associated with the uniformity of the shocks' magnitude. To test the seriousness of the aggregation effect stemming from these two information flow characteristics, we construct two variables. The first variable, U , captures the uniformity in the content of the economic events. U ranges from 0 (no uniformity) to 1.0 (complete uniformity, that is, all of the aggregated shocks have the same content) and is calculated as follows: Let N be the total number of single-shock periods that are aggregated and n be the larger of the number of positive and negative shocks in the N periods. If N is an even number, $U = 1 - \{(N - n)/(0.5*N)\}$; if N is an odd number, $U = 1 - \{(N - n)/[0.5*(N + 1)]\}$. To illustrate, if there are 10 single-shock periods consisting of 8 positive and 2 negative shocks (or vice versa), the value of U is 0.6, which indicates a relatively high degree of uniformity. The second variable measures the uniformity in the magnitude of the economic events by capturing the likelihood that a single large shock determines the sign of the aggregate shock for the period. This variable, SD , is measured as the standard deviation of the individual shocks in the period. The use of either of these variables instead of *DOM* yields results that are very similar to those obtained using *DOM*. This is not surprising given the inherent strong correlation between *DOM* and each of these variables.

TABLE 2
Effect of Uniformity and Dominance of Events on the Differential Timeliness (DT) Measure^a

Portfolio	<i>DOM</i> : Degree of Uniformity and Dominance of News Events ^b	Coefficients from Regression (1) ^c		Adj. R ²
		Return Coefficient, β ₁	DT Measure, β ₂	
Panel A: Sign of Events is Determined Based on Ten-Day Intervals				
1: Firm-quarters most dominated by same-sign events	0.843	-0.061 (-50.67)	0.246 (85.33)	0.069
2	0.550	-0.110 (-26.45)	0.305 (60.96)	0.045
3: Firm-quarters least dominated by same-sign events	0.210	0.218 (9.67)	0.027 (1.18)	0.070
Panel B: Sign of Event is Determined Based on Five-Day Intervals				
1: Firm-quarters most dominated by same-sign events	0.731	-0.048 (-37.82)	0.196 (52.28)	0.036
2	0.448	0.048 (7.59)	0.107 (15.56)	0.046
3: Firm-quarters least dominated by same-sign events	0.164	0.559 (12.33)	-0.348 (-7.67)	0.086
Panel C: Sign of Events is Determined Based on One-Day Intervals				
1: Firm-quarters most dominated by same-sign events	0.731	-0.009 (-5.84)	0.182 (47.52)	0.059
2	0.506	0.058 (16.61)	0.062 (15.56)	0.072
3: Firm-quarters least dominated by same-sign events	0.236	0.226 (12.76)	-0.117 (-6.57)	0.050

^a The total number of firm-quarter observations is 435,077. There are approximately 145,026 observations in each of the three portfolios.

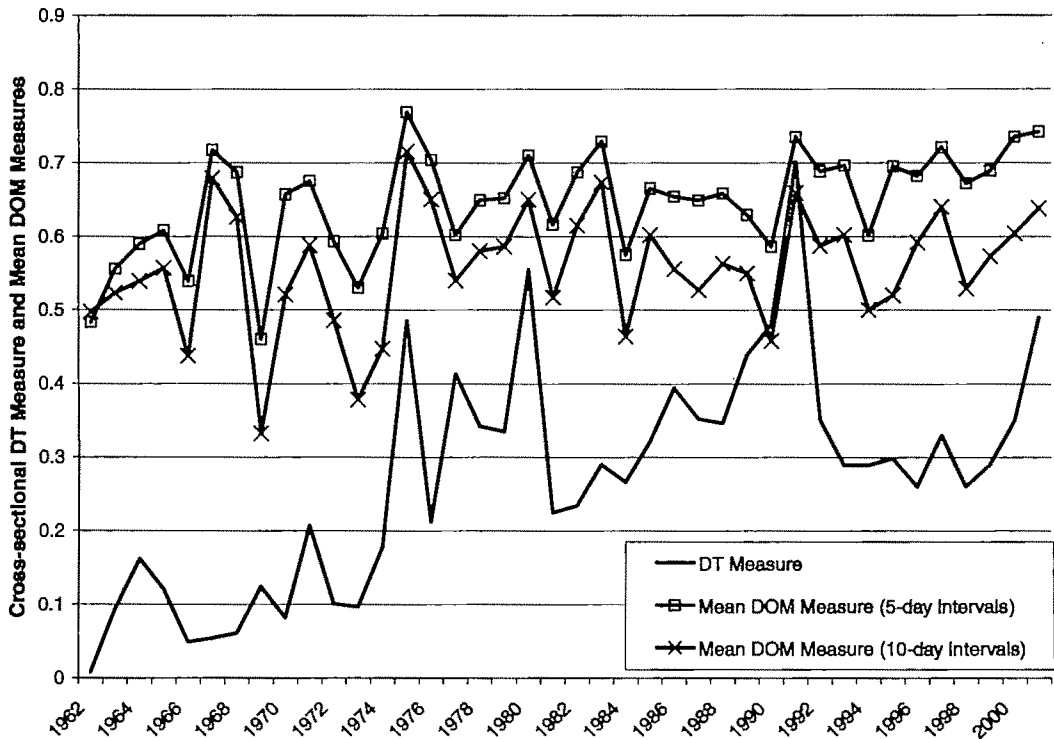
^b *DOM* gauges the degree to which news, as indicated by the sign of the return, dominates a period. It is assessed by Equation (3): $DOM(I) = |Ret| / \text{Larger of } \{|CUM^+| \text{ or } |CUM^-|\}$ where I is the interval length (1, 5 or 10 days), Ret is the return for the aggregated period, and CUM^+ and CUM^- are the accumulations over intervals in the reporting period of positive and negative total returns, respectively. The *DOM* values in the table represent the mean *DOM* of the firm-quarters in each of the three *DOM* portfolios.

^c Coefficients reported are from the cross-sectional estimation over quarterly observations of Regression (1): $EPS_{it}/Price_{it-1} = \alpha_0 + \beta_0 * DUM_{it} + \beta_1 * Return_{it} + \beta_2 * (DUM_{it} * Return_{it}) + \varepsilon_{it}$. t-statistics are reported in parentheses.

when intervals of five days and one day are considered as shown in Panels B and C of Table 2.

The results reported in Table 2 are reinforced when we correlate the annual values of the DT measure estimated cross-sectionally with the annual values of the *DOM* measure computed as described in Equation (3) using annual rather than quarterly return data. Figure 2 depicts the time-series of the annual DT measure and the *DOM* measures based on five- and ten-day intervals. As the figure shows, the measures tend to move in tandem. The correlation coefficient between the annual DT and *DOM* measures is 0.480 (significant at

FIGURE 2
Differential Timeliness (DT) Measure and the Dominance of News (DOM) Measure, by Year^{a,b}



^a The DT measure is the value of the β_2 coefficient from Regression (1), as follows, computed on annual data:

$$EPS_t/Price_{t-1} = \alpha_0 + \beta_0 * DUM_t + \beta_1 * Return_t + \beta_2 * (DUM_t * Return_t) + \varepsilon_t$$

^b $DOM(I) = |Ret| / \text{Larger of } \{|CUM^+| \text{ or } |CUM^-|\}$ where I is the interval length (five-day and ten-day intervals are used in this table), Ret is the return over the aggregated period, and CUM^+ and CUM^- are the accumulations over intervals in the reporting period with the positive and negative total returns, respectively.

the 1 percent level) for the five-day interval calculations and 0.381 (significant at the 5 percent level) for the ten-day interval calculations. Similar results are obtained for the DT ratio, $(\beta_1 + \beta_2)/\beta_1$, which reflects the earnings response to bad news relative to good news. This strong and significant association suggests that comparisons of the DT measure between time periods (e.g., between periods with different degrees of litigation risk) should control for this factor.

The association between the uniformity and “dominance” of the news and the DT measure suggests that this measure understates conservatism for firms where the information environment is characterized by a smooth and frequent arrival of news relative to firms for which the news arrives less frequently and is less even in terms of content and magnitude. The information environment of larger firms is more likely to conform to the former characterization with the news flow being continuous throughout the period. In contrast, for smaller firms, news is more likely to occur in clusters around a particular news event with the result that their period returns will reflect a single or a small number of events.

To test this prediction, we group firms into ten size portfolios each year based on their market value of equity at the beginning of the year and then estimate the mean *DOM* measure derived from daily returns for each portfolio. Table 3 confirms the prediction that the *DOM* values are inversely related to firm size. The mean *DOM* value for the largest 10 percent of the firms is 0.404 and increases monotonically as firm size decreases, with the smallest 10 percent of the firms having a mean *DOM* of 0.649.⁶

Column 3 of Table 3 shows the DT measure for each size portfolio estimated from the pooled firm-years in each portfolio. Note that the DT measure increases as the firm size decreases. For firms in the smallest size decile (portfolio 10), the DT measure is 0.314. It declines monotonically to 0.113 for the largest firms (portfolio 1). This finding, while consistent with other studies that use the DT measure to gauge conservatism,⁷ is a bit surprising in light of the fact that larger firms are expected to report more conservatively due to their greater exposure to public scrutiny and thus to greater political costs (Watts and Zimmerman 1986). Further, larger firms are likely to have a lower degree of information asymmetry with external parties than smaller firms (Bhushan 1989), thereby reducing their incentives to use more aggressive accounting practices (see Richardson 1997).

TABLE 3
Distribution of the Differential Timeliness (DT) and the *DOM* Measures
by Firm Size Portfolios

Size Portfolio ^a	Mean Value of <i>DOM</i> ^b	DT Measure ^c	DT Measure Controlling for <i>DOM</i> ^d
1: Largest firms	0.404	0.113	0.009
2	0.415	0.109	0.022
3	0.435	0.152	0.052
4	0.448	0.170	0.042
5	0.462	0.161	0.061
6	0.479	0.188	0.026
7	0.498	0.245	0.260
8	0.523	0.234	0.135
9	0.576	0.273	0.206
10: Smallest Firms	0.649	0.314	0.061

^a Size portfolios are based on the market value of equity estimated at the beginning of each year. The number of firm-years in each portfolio is about 12,360.

^b $DOM(I) = |Ret| / \text{Larger of } \{|CUM^+| \text{ or } |CUM^-|\}$ where I is the interval length (five-day intervals are reported in this table), Ret is the return over the aggregated period, and CUM^+ and CUM^- are the accumulations over intervals in the reporting period with the positive and negative total returns, respectively.

^c The DT measure is the β_2 coefficient from Regression (1) estimated cross-sectionally over firm-years within each portfolio: $EPS_{it}/Price_{it-1} = \alpha_0 + \beta_0 * DUM_{it} + \beta_1 * Return_{it} + \beta_2 * (DUM_{it} * Return_{it}) + e_{it}$.

^d To control for the effect of aggregation as captured by *DOM*, firm-year observations within each size portfolio are ranked by their *DOM* and assigned to one of ten *DOM* portfolios. Next, Regression (1) is estimated for each of the ten *DOM* portfolios within each firm-size portfolio. The estimated values of each coefficient in Regression (1) for the ten *DOM* portfolios are then averaged within each size portfolio to derive an adjusted value of the DT measure.

⁶ The results reported are based on *DOM* computed on five-day intervals. Similar results are obtained when *DOM* is based on one-day and ten-day intervals.

⁷ See for example Basu et al. (2001a, 2001b), Giner and Rees (2001), and Ryan and Zarowin (2001).

We expect that the higher DT values for smaller firms result from the differential aggregation effect inherent in measuring the DT value for small versus large firms. To control for the effect of aggregation, we rank the firm-year observations for each size portfolio by their *DOM* and then assign them to ten *DOM* portfolios. Next we estimate Regression (1) for each of the ten *DOM* portfolios within each firm-size portfolio. Finally, we average the ten estimated DT measures within each size portfolio to derive a “*DOM* neutral” value of the measure.

As shown in column 4 of Table 3, after controlling for the dominance of news events in the period as assessed by *DOM*, the strong inverse association between firm size and conservatism almost completely dissipates. The difference between the DT measure of the largest 10 percent of the firms and the smallest 10 percent of the firms (those in portfolios 1 and 10, respectively) shrinks from 0.201 (0.314–0.113) to 0.052 (0.061–0.009). These findings reinforce the notion that the DT measure is sensitive to the properties of the aggregated data upon which it is derived. They also suggest that the lack of control for the differential sensitivity of firms to this factor, as captured by *DOM*, may lead to anomalous results regarding conservatism.

Time-Series and Cross-Sectional Aggregation

The discussion thus far as well as the results from the simulation model and those based on actual data presented above are all couched in terms of aggregating individual events, or economic shocks, over time. Note that accounting conservatism may not be exercised continuously in response to individual economic shocks but rather may be applied discretely, with respect to aggregate developments in the period. Most notably, the application of the lower of cost or market rule (LCM) to accounts such as receivables or inventories represents an end-of-period response to aggregate developments during the period (e.g., deterioration in the creditworthiness of customers or a decline in inventory market prices). With this in mind, one might argue that since conservatism is applied with an eye to the aggregate effect of events, the degree of aggregation of individual events over time does not pose a problem for the measurement and interpretation of the DT measure.

However, conservatism is routinely applied continuously to individual economic (price-moving) events during the period. For example, the receipt of a new order is not recorded immediately as revenue, expenditures on internally developed intangibles are expensed as incurred, a potential gain from filing a lawsuit is not recognized until settlement, and the expected economic benefits from a successful acquisition must await their realization. Further, even if all of the events that trigger conservatism were in the form of end-of-period adjustments, a cross-sectional aggregation effect would still exist and hinder a correct assessment of conservatism by the DT measure unless the occurrence of these events and their earnings consequences are both perfectly and positively correlated. For example, assume at the extreme that all recordable transactions are in the form of end-of-period adjustments to accounts receivable and inventories. If the write-downs of inventories are traced to economic events (and hence price movements) that are uncorrelated with the events that precipitate the accounts receivable write-offs, then the aggregation problem will still be present.

Effect of the Nature of Economic Events on the DT Measure

The DT measure interprets the differential earnings response to favorable and unfavorable economic events as an indication of the degree of conservatism. The implicit assumption is that all economic events are potentially reportable in the period in which they occur.

However, regardless of the extent of reporting conservatism practiced by firms, certain economic events will never, or only marginally, affect current earnings. Examples of events of this type are the receipt by the firm of a new long-term contract, a change in interest rates that does not affect existing debt, a new regulation that will affect only future operations and cash flows, an anticipated (but not yet enacted) change in the future tax rate, obtaining or failing to obtain FDA approval of a new drug, a successful invention, or the departure of the CEO. Because these events are likely to affect the current period's returns but not the current period's earnings, their frequency and economic significance during the test period affect the magnitude of the DT measure. Specifically, the DT measure will be overstated (understated) for time periods or for firms where there is a preponderance of favorable (unfavorable) events of this type, leading to erroneous inferences about the degree of reporting conservatism for these periods or firms.

To illustrate, the future effects of current shocks such as a decrease (an increase) in interest rates will be immediately impounded in stock prices. However, the increase (decline) in earnings in the current period will only partially reflect that effect. The resulting observation, namely that earnings do not respond or only partially respond to good (bad) news, will lead unduly to the inference of conservative (aggressive) accounting.

While these events affect the *overall* difference between the economic, or market-based, valuation of income and assets and their accounting valuation, the occurrence of these events is unrelated to the conservative "behavior" by parties involved in financial reporting. Yet, most studies on conservatism focus on the behavioral, regulatory, or standard-setting aspects of reporting conservatism. They aim at measuring the "discretionary" component of conservatism over which, presumably, those involved in producing the financial reports have control. To gain insight into these discretionary aspects, it is thus necessary to control for the nature of the transactions and events in the test sample.

The potential effects of positive or negative price-moving events (hereafter referred to as positive or negative events) that are not captured in current income are demonstrated through a simulation analysis of returns and earnings as described in Appendix B. Results of this simulation are presented in Table 4. Each of the estimations is based on 100,000 observations generated according to the methodology described in the appendix. As shown in the table, as the sample is injected with an increasing number of positive events, the DT measure increases, suggesting more conservative reporting. As Panel A of Table 4 shows, the DT measure, which by construction is 0 under neutral reporting, increases from the 0 starting point to 0.007, 0.016, and 0.039 as the proportion of positive events increases to 10 percent, 20 percent, and 50 percent, respectively. In contrast, when the proportion of negative events increases in the sample, the DT measure of 0 in the neutral-reporting base sample becomes increasingly negative, creating the appearance of more aggressive reporting. Similar directional effects on the DT measure are observed when the base sample assumes conservative reporting as shown in Panel B. For this sample, too, the reporting regime as gauged by the DT measure appears more conservative with the influx of positive events and less conservative and even aggressive with an increase in the proportion of negative events. Similar conclusions about the effect of these price-moving events, events that have no impact on the current period's earnings, on inferences regarding the reporting regime are drawn when the DT ratio is considered.

Effect of the Nature of Economic Events in Actual Data

The simulation results demonstrate how "leading" economic events affect the DT measure. In this section we provide evidence that this effect is present in actual data and that

TABLE 4
Effect of Positive and Negative Economic Events on the Differential Timeliness (DT) Measure:
Estimation of Regression (1) from Simulated Data^{a,b}

<u>Reporting Stance</u>	<u>Intercept</u>	<u>DUM</u>	<u>Return Coefficient, β_1</u>	<u>DT Measure, β_2</u>	<u>Adj. R²</u>
Panel A: "Neutral" Reporting					
Base sample	0.002 (73.46)	-0.004 (-103.03)	0.080 (297.79)	0.000 (0.95)	0.983
Sample consists of:					
10% Positive Events	0.002 (32.13)	-0.004 (-49.84)	0.073 (145.68)	0.007 (9.45)	0.937
20% Positive Events	0.002 (24.22)	-0.004 (-39.20)	0.064 (101.95)	0.016 (17.70)	0.894
50% Positive Events	0.001 (11.44)	-0.003 (-26.18)	0.041 (54.59)	0.039 (36.12)	0.803
10% Negative Events	0.002 (39.00)	-0.004 (-52.11)	0.080 (157.89)	-0.007 (-10.55)	0.936
20% Negative Events	0.002 (30.96)	-0.004 (-39.98)	0.080 (126.83)	-0.016 (-18.30)	0.894
50% Negative Events	0.002 (25.89)	-0.003 (-27.31)	0.080 (105.28)	-0.040 (-37.20)	0.804
Panel B: Conservative Reporting					
Base sample	0.001 (40.94)	-0.003 (-84.85)	0.040 (162.52)	0.040 (116.97)	0.975
Sample consists of:					
10% Positive events	0.001 (24.91)	-0.003 (-59.97)	0.037 (114.00)	0.043 (95.03)	0.955
20% Positive events	0.001 (20.88)	-0.003 (-52.09)	0.032 (86.09)	0.048 (91.47)	0.936
50% Positive events	0.000 (10.45)	-0.002 (-39.86)	0.021 (48.88)	0.059 (99.59)	0.902
10% Negative events	0.001 (19.98)	-0.003 (-39.16)	0.040 (80.83)	0.032 (46.75)	0.894
20% Negative events	0.001 (15.72)	-0.003 (-29.46)	0.040 (64.35)	0.024 (27.07)	0.820
50% Negative events	0.001 (13.07)	-0.002 (-18.30)	0.040 (53.21)	0.000 (0.13)	0.649

^a Coefficients reported are from Regression (1):

$EPS_{it}/Price_{it-1} = \alpha_0 + \beta_0 * DUM_{it} + \beta_1 * Return_{it} + \beta_2 * (DUM_{it} * Return_{it}) + \varepsilon_{it}$ T-statistics are shown in parentheses.

^b The simulation methodology is described in Appendix B. The results reported in the table are based on the regression estimated on 100,000 simulated observations.

it could unduly influence the magnitude of the DT measure, thus leading to incorrect inferences about the level of reporting conservatism.

To provide such evidence, we identify four events that are likely to materially affect firms' stock prices but that are unlikely to affect contemporaneous earnings. We then examine the DT measure of samples dominated by such events. The four types of events that we examine are announcements of acquisition bids, new contracts, lawsuit filings, and SEC

investigations. Past research suggests that these events are associated with abnormal returns of, respectively, target firms (see Jensen and Ruback 1983), firms that are awarded new contracts, firms against which lawsuits are filed, or firms being investigated by the SEC (see, for example, Beneish 1999). These abnormal returns, however, are unlikely to be related to the firms' reported earnings in the current period. To the extent that the price effects of these events are strong enough to determine the sign of the overall period's return, samples with a high frequency of events resulting in positive stock returns that are unlikely to be reflected in the current period's earnings (e.g., acquisition announcements or contract awards) are expected to appear more conservative when viewed through the "lens" of the DT measure. Similarly, to the extent that samples contain firms that experience negative returns without a corresponding decline in contemporaneous earnings (e.g., those subject to lawsuit filings or SEC investigations), their reporting stance is expected to appear more aggressive as assessed by the DT measure.

The results are reported in Table 5. Both target firms (Panel A) and firms awarded contracts (Panel B) have much higher DT measures than comparison groups consisting of the remaining firm-quarters that were not included in the target sample, a matched group of firms operating in the same industries and close in size to the two samples, or the same firms one year prior to the acquisition bid or contract award. Firms that became defendants in class action lawsuits (Panel C) or subject to an SEC investigation (Panel D) show exactly the opposite results. Even though the sample sizes are small and, in the case of the SEC investigations, the sample yields a very low adjusted R^2 , the results are consistent with the hypothesized dampening effect of these events on the DT measure.

Interpreting the higher DT values of the target and contract-award firms (or the lower DT values of the sued or investigated firms) as an indication of a higher (or lower) level of conservatism is technically correct. Yet this assessment of the degree of conservatism is devoid of any accounting implications since the result reflects the nature of the events experienced by these firms rather than any discretion exercised in their reporting stance.

Effect of Disclosure Policy

An implicit assumption in the use of returns to surrogate for news in constructing the DT measure is that prices reflect all publicly available information correctly and in a timely manner, that is, market efficiency is of the semi-strong form. However, assuming the semi-strong form of efficiency and some managerial discretion over the release time of firm-unique information, the timing of information disclosures affects the earnings-return relation and thus the extent of conservatism as measured by the DT measure. Holding the reporting system constant, firms that tend to disclose good news more promptly will exhibit a longer lag between the release of good news (relative to bad news) and its subsequent incorporation in earnings.⁸ Since the earnings report will reflect the good news later than the stock price, the DT measure will be higher in the earnings release period suggesting a greater level of conservatism. In contrast, management with a more "conservative" or cautious disclosure policy may release bad news more promptly. Since the effect of the bad news in earnings will lag behind the immediate adverse price effect generated by the news disclosure, the DT measure will be lower in the earnings release period suggesting more aggressive reporting.

⁸ This tendency is consistent with findings of an earlier release of "good news" reports and a delay in the release of "bad news" reports (see Chambers and Penman 1984; Givoly and Palmon 1982; McNichols 1988).

TABLE 5
Differential Timeliness (DT) Measure Estimated from Periods Dominated by Economic Events that are Likely to Affect Returns but Not Earnings^a

Type of News Event	Intercept	DUM	Return Coefficient, β_1	DT Measure, β_2	Adj. R ²
Panel A: Announcement of a Merger or Tender Offer^b					
Target firms (n = 7,058)	0.007 (3.99)	0.003 (0.97)	-0.038 (-7.65)	0.252 (18.73)	0.044
All firms excluding target firms (n = 428,283)	0.010 (43.01)	0.002 (5.93)	-0.032 (-30.56)	0.153 (94.22)	0.040
Matched group (n = 11,233) ^c	0.008 (1.47)	-0.002 (-0.48)	-0.019 (-3.18)	0.144 (3.57)	0.051
Target firms one year prior to the announcement quarter (n = 7,058)	0.012 (4.77)	0.003 (0.87)	-0.049 (-5.68)	0.187 (11.46)	0.048
Panel B: Announcement of a Contract Award^d					
Contract winners only (n = 41)	0.009 (1.10)	0.021 (1.46)	-0.009 (-0.86)	0.342 (3.97)	0.071
Matched group (n = 95) ^c	0.002 (0.54)	0.006 (0.72)	-0.018 (-2.41)	0.121 (3.68)	0.035
Contract winners one year prior to the announcement quarter (n = 41)	0.006 (0.89)	0.015 (1.23)	-0.012 (-2.54)	0.210 (2.54)	0.039
Panel C: Announcement of a Class Action Lawsuit^d					
Defendant firms (n = 42)	0.010 (1.92)	0.006 (1.54)	0.021 (2.87)	0.018 (1.58)	0.071
Matched group (n = 128) ^c	-0.004 (-0.37)	-0.002 (-0.41)	-0.012 (-0.85)	0.086 (2.97)	0.044
Defendant firms one year prior to the announcement quarter (n = 42)	0.006 (1.23)	0.010 (1.43)	0.019 (1.97)	0.071 (3.38)	0.049
Panel D: Announcement of an SEC Investigation^d					
Investigated firms (n = 52)	0.009 (0.13)	-0.049 (-0.55)	-0.057 (-0.30)	0.056 (0.23)	0.005
Matched group (n = 547) ^c	-0.009 (-1.07)	-0.002 (-0.15)	-0.017 (-0.88)	0.098 (3.02)	0.022
Investigated firms one year prior to the announcement quarter (n = 52)	-0.018 (-1.00)	0.019 (0.62)	0.005 (0.16)	0.088 (0.84)	0.004

^a Coefficients are from Regression (1) estimated cross-sectionally over firm-quarters containing the announcement:
 $EPS_{jt}/Price_{jt-1} = \alpha_0 + \beta_0 * DUM_{jt} + \beta_1 * Return_{jt} + \beta_2 * (DUM_{jt} * Return_{jt}) + \epsilon_{jt}$ T-statistics are shown in parentheses.

^b Target firms and the announcement dates were drawn from the SDC Platinum Database for the years 1980–2000.

^c Sample firms are matched with firms in the same industry (based on their four-digit SIC) during the announcement quarter that are within ± 25 percent of the size of the sample firm based on the market value of equity.

^d Firms awarded contracts during 1995–2001 or that became defendants in class action lawsuits during 1998–2001 are identified in the ProQuest database. Firms that became subject to an SEC investigation during 1994–2001 are identified from the SEC's website (<http://www.sec.gov>). Regression (1) is run over the quarter in which the contract award is announced, the lawsuit is filed, or the SEC investigation is announced.

The disclosure patterns described above are in fact documented in the literature. For example, there are a greater number of voluntary disclosures of favorable information preceding earnings increases (Penman 1980; Miller 2002). Similarly, there are more voluntary disclosures of unfavorable information (e.g., “earnings warnings”) before an extreme drop in earnings (Skinner 1994, 1997).

This interaction between management disclosure policy and the DT measure is of concern in studies on the differential response of earnings to good versus bad news because the same factors that affect differential reporting timeliness (such as corporate governance or litigation risk) also influence disclosure policies. Unless management is assumed to have a neutral disclosure policy—a fairly tenuous assumption—the DT measure will reflect the differential reporting timeliness with bias. For example, if a highly litigious environment prompts management to preempt bad news by disclosing it early (before it is reported or even reportable under GAAP), then the DT measure will underestimate the degree of conservatism.

Furthermore, substitution may exist between the disclosure and reporting policies. To the extent that a more conservative reporting strategy permits a more aggressive disclosure policy, the DT measure will accentuate actual differences in the degree of reporting conservatism. Firms that have an aggressive (conservative) reporting policy that is “compensated” by a more conservative (aggressive) disclosure policy will show a higher (lower) DT measure than warranted by their reporting choices.

While we do not test the effect of this interaction between reporting and disclosure policies, the endogenous nature of firms’ reporting strategies and their disclosure policies should be considered in studies where the factors hypothesized to affect differences in the degree of conservatism, as assessed by the DT measure, potentially overlap with those affecting disclosure policies.⁹

VI. INDICATIONS OF THE MEASUREMENT ERROR IN THE DT MEASURE

The limitations of the DT measure identified and analyzed in the previous sections suggest that it is sensitive to factors such as characteristics of the information flow or the nature of price-moving events that occur during the period. These factors are unrelated to conservatism and are likely to vary considerably over time and cross-sectionally. It is thus unlikely that the DT measure will reflect exclusively the phenomenon it is designed to capture—the asymmetric timeliness of the recognition of gains and losses. In this section, we provide some evidence indicating the extent of the measurement errors in the DT measure. We do so by examining whether the time-series and cross-sectional behavior of the DT measure is consistent with two prior expectations regarding conservatism. The first expectation is that, given the inherent conservative nature of accounting, the DT measure will indicate that conservatism is preponderant among firms. The second expectation is that a firm’s level of conservatism relative to that of other firms in the sample, as captured by the DT measure, is fairly stable over time. These expectations are further explained and analyzed below.

Prevalence of Conservatism

Conventional accounting is inherently conservative as evidenced by the fact that net assets are consistently understated (see Watts 2003a, 2003b). Aggressive accounting choices

⁹ Gigler and Hemmer (2001) relate conservative reporting to disclosure policies in a model where firms in less conservative reporting regimes are more likely to provide preemptive voluntary disclosures than firms in more conservative regimes. For the less conservative reporters, returns lead earnings and thus their earnings reflect the news on a less timely basis than firms with more conservative accounting.

by management may reduce the degree of reporting conservatism, but they cannot turn the whole tenor of the financial statements to being non-conservative or even neutral. In particular, economic gains will seldom (if ever) be recognized in earnings earlier than economic losses since GAAP does not allow recognizing gains before they are realized but does permit (and often requires) the recognition of losses prior to their materialization. Therefore, when the DT measure is used to identify conservatism, it should detect a clear preponderance of conservative reporting among firms.

To test this prediction, we estimate Regression (1) over the annual time-series of firms for which at least ten years of data are available from 1951 to 2001 and over the quarterly time-series of firms for which at least 20 quarterly observations are available from 1972 to 2001. To ensure a sufficient number of "bad news" observations, only firms with at least six observations of negative returns in the time-series are analyzed. The resulting sample consists of 3,181 firm observations using annual data and 8,687 firm observations using quarterly data.

The results, presented in Table 6, show that over 40 percent of the firms examined from both the annual and quarterly data exhibit a negative DT measure. This ostensibly suggests that contrary to conservative reporting, these firms recognize favorable events in earnings on a timelier basis than they recognize unfavorable ones. Further, for those firms whose annual (quarterly) data result in a positive DT measure, the measure is significant for only 15.1 percent (22.8 percent) of the annual (quarterly) cases, even at a significance level of only 10 percent. For the entire annual and quarterly samples, a significant level of conservatism, as indicated by a positive DT measure at the "lenient" 10 percent significance level, is detected only in 8.1 percent (257/3,181) and 13.5 percent (1,172/1,484) of the firms, respectively.

The lack of a significantly positive DT measure in the time-series of many firms may be due to the small number of observations with negative returns and, hence, a low test power. To increase the power of the test, we replicate the tests in Table 6 for firms whose quarterly time-series contains at least 20 (rather than only six) quarters of negative returns and at least 20 quarters of positive returns. This reduces the number of firms to 594 but leaves intact the finding that only a small percentage of the firms (in this case 18.9 percent) have a positive and significant DT measure.

The inability of the DT measure to detect the basic conservative posture of conventional accounting in all, or even a large majority of, firms indicates that the measure is subject to considerable measurement error or to a downward bias. To gain some perspective on the extent of this error, we estimate a related time-series parameter, the earnings response coefficient, ERC, δ_1 in Equation (2), using firms' annual and quarterly data. This parameter, which captures the informativeness of earnings numbers, is expected to be positive. However, because of measurement errors, estimates for some firms may not be positive. The results indicate that the frequency of positive ERC measures is fairly high. For the annual (quarterly) sample, 90.3 percent (79.4 percent) of the firms have the expected positive sign and 51.2 percent (58.7 percent) have a significantly positive coefficient (at the 10 percent level). This preponderance of significantly positive ERC coefficients stands in sharp contrast to the relatively low percentage of firms with significantly positive DT measures reported in Table 6. This suggests the presence of a considerable measurement error in the estimation of the DT measure.

Stability and Persistence of Conservatism

The firm's degree of reporting conservatism is affected by certain firm attributes (see Watts and Zimmerman 1986). Most of these, such as the corporate culture, firm size,

TABLE 6
Prevalence of Conservative Reporting as Gauged by the Differential Timeliness (DT) Measure:
Results from Firms' Time-Series Analysis

Sign of the DT Measure^a	Total Number (percent) of Firms	Number (percent) of Firms with a Significant DT Measure at the 10 percent Level or Better
Panel A: Annual Time-Series Data		
Positive (indicating conservatism)	1,706 (53.6%)	257 (15.1%)
Negative (indicating non-conservatism)	1,475 (46.4%)	181 (12.3%)
All observations	3,181 (100.0%)	438 (13.8%)
Panel B: Quarterly Time-Series Data		
Positive (indicating conservatism)	5,143 (59.2%)	1,172 (22.8%)
Negative (indicating non-conservatism)	3,544 (40.8%)	312 (8.8%)
All observations	8,687 (100.0%)	1,484 (17.1%)

^a The DT measure, β_2 , is derived from Regression (1):
 $EPS_{jt}/Price_{j,t-1} = \alpha_0 + \beta_0 * DUM_{jt} + \beta_1 * Return_{jt} + \beta_2 * (DUM_{jt} * Return_{jt}) + \epsilon_{jt}$. To be included in this analysis, firms must have at least 10 (20) annual (quarterly) observations and at least six of these had to have negative returns. Observations at the extreme ± 1 percent of the $EPS_{jt}/Price_{j,t-1}$ and $Return_{jt}$ distributions are excluded from the analysis.

management incentives, corporate governance, and size of auditor are likely to be fairly stable and would not be expected to drastically fluctuate from one reporting period to the next. This assumption of a relatively stable conservatism stance is made implicitly by studies on the effect of conservatism on the firm's cost of capital (Francis et al. 2004), on cross-country differences in conservatism arising from differences in the legal/judicial system, securities laws, political economy, and tax regimes (see, for example, Ball et al. 2003; Bushman and Piotroski 2006), and on the differences between the extent of conservatism in different industries (Kwon 2002) or different auditors (Krishnan 2003). If the DT measure captures the degree of a firm's reporting conservatism, then it should be relatively stable over time. That is, while firms may gradually, over several years, become more or less conservative, the extent of their conservatism should not vary significantly from year to year or from one quarter to the next.

To test the stability of the DT measure over time, we examine the correlation between the values of firms' DT measures estimated from successive non-overlapping periods. For this analysis, a sample of firms with at least 80 quarters of uninterrupted data over the period from 1981 to 2000 is drawn. The 80-quarter time-series of each firm is then divided into successive, non-overlapping subperiods each consisting of, alternately, 40 quarters (for a total of two ten-year subperiods), 20 quarters (four five-year subperiods) and 10 quarters (eight two-and-a-half-year subperiods). Regression (1) is estimated from the quarterly time-series of the firm in each subperiod to derive β_2 , the DT measure. We then compute the correlation coefficient across the sample firms between their DT measures in any two successive subperiods. To control for the possibility that the earnings response to *both* good news and bad news moves up or down in tandem over time, we repeat the above analysis using, instead of the DT measure, the DT ratio.

The results of this stability test, reported in Table 7 (columns two and three), indicate that the DT measure is not stable over time. The association between the DT measure in successive subperiods of ten years, five years, or two-and-a-half years is nonexistent, with virtually all of the correlation coefficients (both Pearson and Spearman rank order) being insignificantly different from zero. Similar results (not tabulated) are obtained for the DT ratio. These results are in apparent conflict with the notion that the degree of reporting conservatism is a fairly stable firm characteristic.

To put the stationarity of the DT measure in perspective, we compare it to that of three other measures of conservatism used by researchers, the book-to-market ratio (Stober 1996), cumulative discretionary accruals¹⁰ (Givoly and Hayn 2000; Ahmed et al. 2002) and the persistence of losses versus profits¹¹ (Basu 1997; Ball and Shivakumar 2005), as well as to two other estimates of fundamental attributes of the firm: its earnings response coefficient (ERC) and beta. Similar to conservatism, these attributes represent characteristics of the firm's operating and economic environment that are expected to be fairly stable over time. Like the DT measure, these measures are also subject to measurement error, which tends to dampen their measured stability over time. Nonetheless, the results reported in Table 7 show that, in sharp contrast to the DT measure, the other five measures are fairly stable over time. This finding suggests that the intertemporal instability in the DT measure is unlikely to be due to shifts in firms' fundamental characteristics.

Because many studies estimate the DT measure from annual data, we also compute the correlation between the estimates of this measure made from *annual* data over two successive periods of 20 years each (spanning the years 1962 to 2001). The results (not tabulated) based on the 146 firms that existed throughout this period indicate that the correlation coefficient between the measure in the two 20-year periods is low, 0.06, and insignificant. Again as a benchmark, the respective correlation coefficients between the values of the mean book-to-market ratios, the ERCs, and the firms' betas in the two 20-year periods are computed; they are much higher at 0.654, 0.189, and 0.756, respectively, and are statistically significant at the .05 level or higher.

Arguably, the level of a firm's conservatism could change over a long period such as 20 years. Even the shortest period over which we assess the stability of the DT measure, two-and-a-half years, may be too long for the purpose of this analysis, leading to the low correlations reported in Table 7 for the DT measure. To gain insight on the extent of the stability of the DT measure over very short periods, we conduct the following time-series analysis. For each firm with at least 20 quarters of data, we randomly select one-half of the quarterly observations over the available time interval, estimate the DT measure based on these observations, and rank firms by that measure. We repeat this process for each firm, using the remainder of its quarterly observations and compute a rank correlation coefficient between the two rankings. A strong correspondence between the firm's rankings obtained from the two different subsets of its quarterly data is consistent with the notion that conservatism is a fairly persistent trait that does not fluctuate from quarter to quarter.

¹⁰ Cumulative discretionary accruals are measured as the accumulation over time of [total accruals – operating accruals – depreciation and amortization] standardized by total assets at the beginning of the accumulation period. Operating accruals equal the [change in accounts receivable + change in inventories + change in prepaid expenses – change in accounts payable – change in taxes payable] (see Givoly and Hayn 2000).

¹¹ The differential persistence of good versus bad earnings news is measured by α_3 in the following equation: $\Delta NI_t = \alpha_0 + \alpha_1 \Delta \Delta NI_{t-1} + \alpha_2 \Delta NI_{t-1} + \alpha_3 \Delta \Delta NI_{t-1} * \Delta NI_{t-1} + \mu_t$, where ΔNI_t is change in income (alternatively defined as including and excluding extraordinary and exceptional items) from fiscal year $t-1$ to t , scaled by beginning book value of total assets. $\Delta \Delta NI_{t-1}$ is a dummy variable set equal to 1 if ΔNI_{t-1} is negative, and 0 otherwise (see Basu 1997).

TABLE 7
Stability of the Differential Timeliness (DT) Measure and Other Measures:
Correlation Coefficients between the Values of the Measures over Successive Subperiods^a

Length of Successive Periods over which Stability is Measured	Differential Timeliness Measure, β_2^b		Book-to-Market Ratio		Cumulative Discretionary Accruals ^c		Differential Persistence of Good versus Bad Earnings News ^d		Earnings Response Coefficient (ERC) ^e		Beta ^f	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
(a) 10 years	0.051	0.064	0.702*	0.748*	0.456*	0.658*	0.506*	0.564*	0.215*	0.228*	0.556*	0.576*
(b) 5 years	-0.005	0.062	0.742*	0.793*	0.683*	0.699*	0.391*	0.452*	0.210*	0.243*	0.422*	0.458*
(c) 2-1/2 years	0.001	0.018	0.814*	0.887*	0.572*	0.771*	0.142	0.231*	0.273*	0.227*	0.361*	0.391*

* The individual correlation or, if a mean correlation is reported, all of the individual correlations upon which the mean is based, are significantly different from 0 at the 5 percent significance level or higher.

^a The number of firms for which the correlations are computed varies from 451 to 839 depending on the length of the period (10 years, 5 years, or 2-1/2 years) and the measure examined. The table contains the Pearson and Spearman rank-order correlation coefficients between (a) the two successive ten-year (40 quarters) periods, (b) the mean value of the three correlation coefficients of the four successive five-year (20 quarters) periods, and (c) the mean value of the seven correlation coefficients of the eight successive 2-1/2-year (10 quarters) periods.

^b β_2 is derived from Regression (1): $EPS_{it}/Price_{it-1} = \alpha_0 + \beta_0 \Delta DUM_{it} + \beta_1 \Delta Return_{it} + \beta_2 (DUM_{it} \cdot Return_{it}) + \epsilon_{it}$.

^c Cumulative discretionary accruals are computed as the accumulation over time of [total accruals, - operating accruals, - depreciation and amortization,]/total assets_{t-1}, where operating accruals = Δ accounts receivable + Δ inventories + Δ prepaid expenses - Δ accounts payable - Δ taxes payable.

^d The differential persistence of good versus bad earnings news is defined as α_3 in the following equation: $\Delta NI_t = \alpha_0 + \alpha_1 \Delta NI_{t-1} + \alpha_2 \Delta NI_{t-1} + \alpha_3 \Delta NI_{t-1} \cdot \Delta NI_{t-1} + \mu_t$, where ΔNI_t is the change in income (alternatively defined as including and excluding extraordinary and exceptional items) from fiscal year $t-1$ to t , scaled by the beginning of period book value of total assets. ΔNI_{t-1} is a dummy variable which equals 1 if the prior-year change, ΔNI_{t-1} , is negative, and 0 otherwise.

^e The ERC is estimated from the time-series regression of the quarterly returns on the firm's earnings deflated by the beginning price.

^f Beta is estimated from the time-series regression of monthly returns for the quarter using the market model.

To partition firms into two subsets, we first order a firm's quarters in a chronological sequence and then assign them to one of the two subsets based on the following algorithm. If the year to which the quarter belongs is odd and the quarter is even, or vice versa, then the quarterly observation is assigned to the first subset. If both the year and the quarter are either odd or even, then the quarterly observation is assigned to the second subset. This procedure assures that adjacent quarters in the same year always belong to different subsets and that the fiscal quarters are evenly distributed across the two subsets, thus preventing any effects of seasonality from clustering in a subset.¹²

The results of this "persistence" test are reported in Table 8. Even across alternating quarters of the firm, the DT measure appears to oscillate significantly. Of the firms that are identified by this measure as being among the 10 percent most conservative reporters based on a random half of their quarterly observations (subset 1, portfolio 1 in the table), 37 percent (the total percentage of firms in portfolios 6 to 10 for subset 2, 2.02 percent + 5.14 percent + 4.98 percent + 8.72 percent + 16.51 percent) are classified by the measure as being among the 50 percent most aggressive reporters when the DT measure is estimated from the other half of the firms' quarterly observations. Similarly, of the firms identified by the measure as the 10 percent most aggressive reporters based on a random half of the firms' time-series observations (subset 1, portfolio 10), 54 percent (the total percentage of firms in portfolios 1 to 5 for subset 2, 17.57 percent + 14.46 percent + 7.93 percent + 8.09 percent + 6.22 percent) are classified by the measure as among the 50 percent most conservative reporters when the DT measure is estimated based on the other half of the firms' quarterly observations. Thus, for a significant portion of the sample, depending on which quarters of the firm's time-series are randomly included in the analysis, the firm may appear to be among the more conservative, or the least conservative, reporters. There is however some tendency of firms assigned to the extreme portfolios (portfolios 1 and 10) based on their DT measure in one subperiod to remain in those portfolios when the DT measure is estimated from an alternate subperiod.

Summarizing the above results by a single measure, we find that the rank correlation between the two portfolio ranks (1 to 10) of the 6,429 firms, each based on a different half of the firm's time-series observations, is low, 0.063, as is the correlation across these firms between their two individual conservative rankings (1 to 6,429), of 0.061.^{13,14} Repeating the analysis using the DT ratio, $(\beta_1 + \beta_2)/\beta_1$ and then a subsample of 5,532 firms that have at least 15 quarters with a positive return and 15 quarters with a negative return (in order to increase the power of the test) produces essentially the same results.

To provide a benchmark for this last finding, we examine also the correlation across firms between their two subperiod rankings of the book-to-market ratio, the ERC, and beta. In contrast to the low rank-order correlation of 0.061 for the firms' DT rankings in the two

¹² Two other procedures used to partition each firm's time-series into two subsets produced essentially the same results. In the first of these, the quarters were ordered chronologically and then assigned, alternately, to one of the two subsets. This approach assures that each subset represents all subperiods of the firm's time-series. In the other procedure, we randomly assigned quarters to one of the two sets, with even probabilities.

¹³ We performed a similar examination for annual data, separating each firm's data into two subsets of odd and even years and computing the DT measure over both of the subsets. The correlations between the two measures as well as between the portfolios ranks (which were about 0.03) were even lower than those reported for the quarterly data.

¹⁴ The results concerning the instability of the DT measure are potentially related to the finding that only a relatively small number of firms have a significantly positive time-series DT measure. This is because instability reduces the likelihood of finding significant values of the measure. Note, however, that, the degree of the measure's stability over time affects the significance of both positive and negative values of the measure.

TABLE 8
Persistence of Reporting Conservatism: Percentage of Firms Belonging to Portfolios Formed by the Firm's Differential Timeliness (DT)
Measure Estimated Separately from Two Subsets of the Firm's Quarterly Data^{a,b}

DT Measure Based on Subset 1 of Firm Data		DT Measure Based on Subset 2 of Firm Data									
		Most Conservative					Most Aggressive				
	Portfolio	1	2	3	4	5	6	7	8	9	10
Most Conservative	1	26.17	14.17	11.06	7.17	4.05	2.02	5.14	4.98	8.72	16.52
	2	16.80	15.24	9.02	8.24	5.29	4.51	6.53	7.62	12.13	14.62
	3	8.83	11.66	11.20	11.04	10.26	9.88	6.84	9.80	10.87	9.62
	4	4.35	8.55	10.89	11.66	9.80	9.72	12.91	13.22	10.91	7.99
	5	5.13	6.51	10.58	11.35	11.66	15.55	13.37	11.35	9.02	5.48
	6	3.11	7.47	7.78	10.26	16.80	17.88	14.62	10.73	7.93	3.42
	7	4.20	6.38	9.49	10.42	14.31	15.55	13.62	12.44	7.15	6.44
	8	5.91	6.38	9.76	11.20	12.44	9.18	14.20	11.04	12.44	7.45
	9	7.93	9.18	12.29	10.57	9.18	9.80	7.31	11.66	11.35	10.73
	10	17.57	14.46	7.93	8.09	6.21	5.91	5.46	7.16	9.48	17.73
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

^a (n = 6,429 firms).
^b To compute the entries in this table, each firm's quarterly observations were first partitioned into two subsets as described in the "Stability and Persistence of Conservatism" section. Regression (1) was then estimated for each of these subsets, producing two differential timeliness (DT) measures for each firm. Firms were then ranked into ten portfolios based on the magnitude of their DT measure in each subset. Each cell in the table reflects the percentage of firms that are assigned to portfolio *i* based on subset 1 of their time-series observations (*i* = 1 through 10 as shown in the rows) and to portfolio *j* based on subset 2 of their time-series observations (*j* = 1 through 10 as shown in the columns). For example, 26.17 percent of the firms in the most conservative portfolio based on their DT measure estimated from subset 1 of their time-series are also in the most conservative portfolio based on their DT measure in subset 2. At the other extreme, 16.51 percent of the firms in the most conservative portfolio in subset 1 (portfolio 1) are in the most aggressive portfolio (portfolio 10) in subset 2.

random subsets of the time-series, the respective correlations for the book-to-market ratio, the ERC, and beta (not tabulated) are 0.949, 0.134, and 0.260, respectively.

The lower stability of the DT measure relative to other economic parameters of the firm might be due to the fact that unlike the other parameters examined, the DT measure is estimated over fewer observations (i.e., the subset of periods with negative returns). To rule out this explanation for the findings, we “level the playing field” and replicate Table 8 by estimating the book-to-market ratio, the ERC, and beta in each of the two randomly drawn subperiods (that are used to derive the correlation coefficients between subperiods) using the same number of observations used to estimate the DT measure. The results (not tabulated) continue to show that the other variables are still far more stable. The Spearman rank correlation coefficients between the two values of the variable estimated from the two randomly drawn subsets of the firm’s time-series are 0.725 for the book-to-market ratio, 0.131 for the ERC, and 0.386 for the beta, with all three coefficients being statistically significant at the 1 percent level or higher.¹⁵

Stability of Cross-Sectional Estimates of the DT Measure

The results above address the stability of the DT measure using time-series estimates. However, many studies estimate the DT measure cross-sectionally, within a given sample, an industry, or a country. In this section we extend the analysis to the stability of inferences based on cross-sectional estimates of the measure.

In our first examination of whether a given cross-sectional estimate of the DT measure remains stable over time, we begin by dividing firms into ten equal-sized portfolios based on the magnitude of their time-series DT measure calculated over the prior 40+ quarters of available data ending with quarter 4 of 1988. Portfolio 1 contains firms that are the least conservative (i.e., have the lowest DT measure) and portfolio 10 contains firms that are the most conservative (i.e., have the highest DT measure). We next compute the cross-sectional DT measure of firms in the ten portfolios over each of the nine quarters beginning with the last quarter of the time-series (quarter 4, 1988), Q_0 , and going forward eight quarters to Q_8 (quarter 4, 1990). We rank the portfolios in each quarter, Q_0 – Q_8 , based on the magnitude of their cross-sectional DT that quarter. To assess the stability of the cross-sectional DT measure, we examine the correlation between the portfolios’ quarterly DT rankings. We repeat this analysis 44 times, moving one quarter forward each time.¹⁶ The number of distinct firms participating in each iteration varies somewhat depending on the number of firms with sufficient data, ranging from 1,360 to 2,440. This results in cross-sectional estimates within each portfolio of 136 to 244 firm-quarter observations.

The results of the 45 cross-sectional analyses are aligned across the quarters, Q_0 – Q_8 and presented in Table 9. The average DT measure of each portfolio derived from the firms’ time-series is presented in column two. By design, it ranges from the lowest value in

¹⁵ The DT measure’s lack of stability over time could arise if investors adjust their firm valuations based on the perceived level of reporting conservatism and such perceptions fluctuate over time. Note, however, that market perceptions of the degree of conservatism inherent in the reported numbers are manifested in the market response to earnings disclosures during the short interval around the earnings announcement, whereas the DT measure relies on long windows to measure the earnings-return association. Nonetheless, we assess the potential effect of the variability over time in the market response to earnings releases on the estimated DT measure by replicating the tests in Tables 7 and 8 using the return over the period *excluding* the earnings announcement interval defined as days –1 to +2 relative to the earnings announcement date. The results concerning the stability of the DT measure are essentially the same.

¹⁶ The second analysis thus begins with forming ten portfolios based on the firms’ DT measures estimated for the 41+ quarters of data ending with quarter 1 of 1989, and then estimating the DT measure cross-sectionally for each of these portfolios beginning with quarter 1 of 1989 (Q_0) and going forward eight quarters to quarter 1 of 1991 (Q_8).

TABLE 9
Analysis of the Stability of Cross-Sectional Estimates of the Differential Timeliness (DT) Measure

TABLE 9											
Analysis of the Stability of Cross-Sectional Estimates of the Differential Timeliness (DT) Measure											
Portfolios Based on Magnitude of the Time-Series DT Measure ^a	Mean Value of DT Measure from the Time- Series Estimates	Mean of the Cross-Sectional Estimates of the DT Measure for Q ₀ to Q ₈								Average over Q ₁ to Q ₈	
		Q ₀ ^b	Q ₁	Q ₂	Q ₃	Q ₄	Q ₅	Q ₆	Q ₇		Q ₈
1: Lowest DT Measure	-0.147	0.117	0.157	0.189	0.185	0.178	0.177	0.162	0.171	0.194	0.177
2	-0.061	0.128	0.178	0.141	0.155	0.122	0.128	0.140	0.154	0.163	0.148
3	-0.033	0.122	0.106	0.120	0.123	0.126	0.128	0.129	0.118	0.129	0.122
4	-0.015	0.128	0.106	0.086	0.100	0.116	0.113	0.098	0.110	0.099	0.104
5	0.000	0.139	0.132	0.153	0.109	0.114	0.124	0.134	0.115	0.129	0.126
6	0.013	0.135	0.102	0.106	0.113	0.103	0.118	0.135	0.111	0.103	0.111
7	0.030	0.142	0.130	0.113	0.107	0.132	0.137	0.129	0.160	0.133	0.130
8	0.057	0.141	0.154	0.149	0.153	0.122	0.139	0.109	0.111	0.143	0.135
9	0.109	0.145	0.154	0.156	0.179	0.210	0.184	0.209	0.186	0.185	0.183
10: Highest DT Measure	0.301	0.223	0.232	0.219	0.203	0.188	0.168	0.147	0.140	0.127	0.178
Difference between DT values of portfolios 10 and 1	0.448	0.106	0.075	0.030	0.018	0.010	-0.009	-0.015	-0.031	-0.067	0.001

^a The DT measure for each firm is estimated over at least 40 quarters.
^b Q₀ is the portfolio formation quarter.

^a The DT measure for each firm is estimated over at least 40 quarters.
^b Q₀ is the portfolio formation quarter.

portfolio 1 (of -0.147) to the highest value in portfolio 10 (of 0.301). The results in column three show that in Q_0 (the last quarter of the time-series estimation), the pattern of the cross-sectional estimates of the DT measure over the 10 portfolios corresponds closely to the pattern of the DT estimated from the firms' individual time-series. That is, when pooled cross-sectionally, observations belonging to firms that exhibit the highest (lowest) time-series values of the DT measure also have the highest (lowest) cross-sectional DT measure. This pattern is partially maintained in the following quarter, Q_1 . However, after two or three quarters, the pattern in the cross-sectional DT measure across portfolios completely dissipates. In fact, from Q_5 onward, the cross-sectional DT measure of portfolio 10 (the portfolio of firm-years belonging to firms with the highest time-series DT measure as of Q_0) is even lower than the DT measure of portfolio 1. Further, the DT values for portfolios 1 and 10 over the eight quarters subsequent to Q_0 do not differ much from each other on average, as seen by the results in the last column of Table 9. These findings suggest that even cross-sectional estimates of DT are unstable over time.

To further assess the cross-sectional stability, we revisit the analysis of Ball et al. (2000) (hereafter, BKR), who investigate the relative conservatism of common law countries (Australia, Canada, and the U.S.) and code law countries (France, Germany, and Japan) over the 1985–1995 time period.¹⁷ Their results, based on samples pooled across countries and years, show that the DT measure of common law countries is significantly higher than that of code law countries (0.31 versus 0.01 , see BKR, Table 2, Panel A). This, as well as other results, led BKR to conclude that code law countries report less conservatively than do common law countries.

To determine the stability of this cross-sectional result, we begin by replicating their test for a different, slightly overlapping, period consisting of the ten years from 1994–2003.¹⁸ Estimating the DT measures for each of the two groups, pooled over countries and years produced results qualitatively similar to those obtained by BKR. We find DT measures of 0.27 and 0.13 for common law and code law countries, respectively, as reported in Table 10, Panel A. We then conduct the same analysis for individual years. If the hypothesis that common law countries are more conservative holds, then we would expect that, in any given period, any common law country would show a higher DT measure than any code law country.

To test this expectation, we ranked the DT measures obtained for each of the six countries in the two groups. The results, presented in Panel B of Table 10, show that the ranking of the six countries is inconsistent over time. Only in one of the ten years (2001) did all three common law countries have a higher DT measure than all three code law countries. Australia, a common law country, had one of the highest three DT measures in only three of the ten years, while Germany, a code law country, had one of the highest three DT measures in five out of the ten years. In fact, a code law country had the highest DT measure (e.g., a rank of 1) in five of the ten years. These annual results do not consistently support BKR's main hypothesis that the accounting in common law countries is more conservative than that in code law countries. The difference between the pooled results

¹⁷ BKR narrowed the country groups to these countries to assure that each country was represented in the analysis by at least 1,000 firm-years.

¹⁸ We use data from Global Vantage (GV) to perform this analysis. GV no longer makes data available prior to 1994 so we could not examine the same years used in the BKR study.

TABLE 10
Differential Timeliness (DT) Measure for Pooled versus Annual Results:
Comparison of the Level of Conservatism of Common Law and Code Law Countries

Panel A: DT Measure from Pooled Results

	<u>Common Law Countries</u> <u>(Australia, Canada, U.S.)</u>	<u>Code Law Countries</u> <u>(France, Germany, Japan)</u>
DT measure reported by BKR (2000) for the period 1985–1995 ^a	0.31	0.01
Replication of BKR for the period 1994–2003	0.27	0.13

Panel B: Ranking of Countries by Their Annual DT Measure (1 = highest; 6 = lowest)

<u>Reporting Regime</u> <u>(no. of observations)^b</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>
Common Law Countries										
Australia (n = 2,048)	5	4	1	4	4	5	5	3	2	4
Canada (n = 3,804)	3	3	4	1	1	3	1	1	3	2
U.S. (n = 25,518)	4	2	2	2	3	2	4	2	5	3
Code Law Countries										
France (n = 3,158)	6	5	5	3	2	6	2	5	4	1
Germany (n = 3,305)	1	1	6	6	5	1	3	6	1	5
Japan (n = 23,202)	2	6	3	5	6	4	6	4	6	6

Panel C: Analysis of the Annual Rankings in Panel B

	<u>Frequency</u>
No. of years that code law countries had the:	
(a) highest DT measure (rank = 1)	5 out of 10 annual observations
(b) top two highest DT measures (rank = 1 or 2)	8 out of 20 annual observations
(c) top three highest DT measures (rank = 1, 2, or 3)	11 out of 30 annual observations
No. of years that at least one code law country had a higher DT measure than a common law country	9 out of 10 annual observations

^a Average DT measured reported by Ball et al. (2000; Table 2, Panel A).

^b The total number of observations for each country for the years 1994–2003 is provided.

and the individual years' results is due to the instability of the cross-sectional DT measure over time even within a given reporting regime.¹⁹

These results as well as those reported in Tables 7 and 8, are puzzling since one would expect that the degree of conservatism exhibited by a firm to be a relatively long-term characteristic of the firm's reporting system, spanning several years. A firm's level of conservatism is definitely not expected to be only a one-quarter phenomenon, as suggested by

¹⁹ If the hypothesis holds, then common law countries should exhibit a greater degree of conservatism in each and every period. Therefore, yearly comparisons between countries represent a stronger test of the hypothesis concerning the relative conservatism of common law versus code law countries than a comparison of pooled observations. Even if one believes that a pooled sample across countries and years is the proper methodology for testing the hypothesis, the dominance of U.S. and Japanese observations in the pooled samples of their respective groups (in which they represent 81.3 percent and 78.2 percent of the firm-years, respectively) raises some concerns about the generalization of the results.

some of our results. The instability in the DT measure is likely due, at least in part, to the sensitivity of the measure to the information characteristics explored in Section V. It could also be due, however, to the dependence of the measure on the functional relation between earnings and returns. To the extent that this relation is not linear, differences in the degree of extremity of earnings over time would be reflected in a corresponding instability in the DT measure. Another contributor to instability in the estimate of the DT measure is the potentially small number of observations from which it is estimated (namely, the negative return cases). However, as explained above, in our tests (see the discussions of the results presented in Tables 6, 7, and 8) we control for the paucity of negative return observations.

Finally, it should be noted that stability by itself does not validate a measure. For example, the greater stability of the book-to-market ratio reported in Table 7 does not make this ratio necessarily a better measure of conservatism. In fact, its stability could arise for the “wrong reasons,” that is, reasons unrelated to conservatism, such as persistence in growth expectations or risk perception.

In the following section, we continue to test the validity of the DT measure by examining whether it provides results consistent with a number of additional prior expectations about what the measure should capture.

Ability of the DT Measure to Detect “Situational” Non-Conservative Reporting

If the DT measure correctly portrays the reporting stance of firms, then we would expect that it would be lower for periods when earnings are known to have been managed upward through the accelerated recognition of revenues or gains or the deferred recognition of costs or losses. To examine whether the DT measure indeed detects such “situational aggressive reporting,” we examine two groups of firms for which earnings are likely to be managed upward. Past research suggests that during periods preceding stock or debt issuances, firms seek to improve their reported performance by managing earnings (see, for example, Rangan 1998; Shivakumar 2000; Teoh et al. 1998). Another period in which aggressive reporting is likely to have occurred is one for which earnings are subsequently restated downward. If these situations are indeed associated with aggressive reporting as suggested by anecdotal evidence and by previous research (e.g., Livnat and Tan 2004), then one would expect that the DT measure detects them as such.

We identify “big issuers” as firms making the most sizeable capital issuances each year, defined as those in the top 10 percent of the distribution of the rate of change that year in the growth rate of total equity and long-term debt.²⁰ We estimate Regression (1) over the two years (years $t-1$ and $t-2$) immediately preceding the issuance year (year t). As a benchmark against which to judge the DT measure of big issuers, we examine three control groups. These control groups consist of the same firms over the two years preceding the test period (years $t-4$ and $t-3$), a group of similar size firms (the two firms closest in size to the “big issuer” firm based on total assets in year $t-1$), and the two firms within the same four-digit SIC industry group that are the closest in size and profitability (based on return on assets) in year $t-1$ to the big issuer. Since the latter two control groups consist of firms that “match” the big issuers, we estimate Regression (1) over the same years for these groups (i.e., the two years preceding the issuance year).

To form a sample of “restaters,” we identified 166 firms in the U.S. Government Accounting Office restatement database that announced in 2000 or 2001 that they were

²⁰ Big issuers in year t that were also classified as big issuers in at least one of the two preceding years were eliminated from the analysis.

restating downward previous financial statements due to revenue recognition or cost/expense problems. All of these firms restated their earnings for at least two previous quarters, with most of them restating the results for reporting periods going back up to three years. We estimate the DT measure from a pooled, cross-section of their data over the three years preceding the restatement announcement year, some or all of which reflect overstated earnings and, thus, aggressive accounting. As a benchmark, we contrast the estimated DT coefficient with those estimated for the same firms over the 1994–1996 period, for a group of similar size firms (the two firms closest in asset size to the restater firm in 1996), and for a group of firms operating in the same industries as the restaters that, in 1996, were within ± 10 percent of the restater firm's asset size and ± 20 percent of profitability (based on return on assets). The DT measure for the latter two control groups is estimated over the years 1997–1999.

The results are reported in Table 11. The two groups suspected of aggressive accounting show indeed a significantly greater accumulation of discretionary accruals than their respective control samples (see the third column of the table),²¹ an indication of upward earnings management (see Givoly and Hayn 2000). Yet the DT measure of 0.212 for the big issuers indicates that these firms are reporting as conservatively (if not slightly more so) as are the firms in the three control groups (with DT measures of 0.136, 0.184, and 0.058, respectively).

Similar to big issuers, restaters show a greater accumulation of positive accruals than their respective control groups, consistent with aggressive accounting. Restaters are expected to have a lower DT measure over the years where earnings were eventually restated downward. Yet the estimated DT measure for the restaters sample is 0.119, higher than the DT measure for the same firms in the (presumably) “clean” reporting years (DT measure of 0.092) and significantly higher (at the 5 percent level of significance) than the two other control groups that had DT measures of 0.059 and 0.069, respectively. Rather than reflecting the aggressiveness of the restaters, the DT measure appears to indicate that these firms were more conservative than the control groups in the very periods where earnings were overstated.

The instability of the DT measure discussed in the prior section and its failure to detect conservatism in situations when it is likely to exist and, contrarily, its detection of conservatism when it is not likely to be present are reflective of a large measurement error in this measure.

VII. ASSOCIATION OF THE DT MEASURE WITH OTHER MEASURES OF ACCOUNTING CONSERVATISM

The DT measure has often been used to characterize the degree of conservatism of a reporting regime, such as a country, industry, or legal setting. As noted earlier (see Section III) conservative reporting (i.e., the systematic understatement of the book value of the entity's net assets) may be due not only to the asymmetric timeliness of gain and loss recognition, but also to other features of the entity's reporting system. Focusing on only one of these features will not provide an accurate assessment of the overall degree of conservatism exhibited by the reporting entity. This is particularly true when the different reporting features are not independent of each other. As a result, even if the DT measure were free of the limitations indicated by the above analyses, it captures only one dimension of conservative reporting—it does not fully capture the overall reporting conservatism of the entity.

²¹ Discretionary accruals are defined in footnote 10.

TABLE 11
Extent of Conservatism Exhibited by "Big Issuers" and "Restaters" as Gauged by Their Differential Timeliness (DT) Measure

Sample Examined	No. of Firm-Years	Cumulative Discretionary Accruals (mean values) ^a	Coefficients from Regression (1) ^b		Adj. R ²
			Return Coefficient, β_1	DT Measure, β_2	
"Big Issuers" ^c	9,188	0.027	0.052 (2.68)	0.212 (4.78)	0.015
Control Groups: ^d					
"Big Issuers"—earlier years	9,120	0.010	0.043 (4.12)	0.136 (3.27)	0.012
Similar size firms	18,128	-0.014	0.031 (3.59)	0.184 (2.12)	0.009
Same industry firms	18,268	-0.021	0.067 (7.41)	0.058 (1.46)	0.002
"Restaters" ^e	498	0.049	-0.021 (-4.20)	0.119 (2.89)	0.021
Control Groups: ^f					
"Restaters"—earlier years	498	0.016	0.024 (4.78)	0.092 (3.10)	0.023
Similar size firms	993	-0.008	0.030 (2.87)	0.059 (1.67)	0.010
Same industry firms	3,237	0.014	0.012 (3.57)	0.069 (4.23)	0.027

^a Discretionary accruals are defined as total accruals excluding depreciation, amortization, and operating accruals, where operating accruals equal the change in accounts receivable plus the change in inventory plus the change in prepaid expenses minus the change in accounts payable and the change in taxes payable. These accruals are cumulated over the six years ending with the issue year or the restatement year for the "big issuers" and "restaters," respectively. The same accumulation period is used for the control groups, with the "implied" issue year or restatement year being the same year as in the examined sample. The cumulative discretionary accruals are standardized by total assets at the end of the first year of the accumulation period.

^b Regression (1) is estimated for the "big issuers" over the two years preceding the year of issuance and, for the "restaters," over the three years prior to the restatement announcement year. The coefficients shown in the table are from Regression (1): $EPS_{it}/Price_{it-1} = \alpha_0 + \beta_0 * DUM_{it} + \beta_1 * Return_{it} + \beta_2 * (DUM_{it} * Return_{it}) + \epsilon_{it}$. T-statistics are shown in parentheses.

^c "Big issuers" are defined each year as firms in the top 10 percent of the distribution of the rate of growth in gross equity and debt issues (long-term debt plus the sale of common and preferred stock), divided by the balance of long-term debt plus common and preferred stock at the beginning of the year.

^d The control groups consist of the "big issuer" firms examined over the two years preceding the test period, similar size firms (the two firms closest in size to each "big issuer" firm based on total assets in the year prior to the issuance year) and same industry firms (the two firms in each "big issuer" firm's four-digit SIC industry group that were closest in asset size and profitability (measured as return on assets) to the "big issuer" firm in the year prior to the issuance year).

^e Restaters are firms that announced in 2000 or 2001 that they were restating prior-period earnings downward. The cross-sectional analysis consists of the three firm-years preceding the restatement announcement year.

^f The control groups consist of the "restater" firms examined over the three years (1994–1996) preceding the test period, similar size firms (the two firms closest in asset size to each "restater" firm in 1996), and same industry firms (firms in each "restater" firm's four-digit SIC industry group that were within ± 10 percent of the restater firm's asset size and ± 20 percent of its profitability (based on return on assets)).

The purpose of this section is to identify the different reporting features that contribute to conservatism and document the association between them. To help identify these features, Appendix C provides a classification of the sources of conservatism. Recall that a consequence of conservative accounting is the systematic understatement of the entity's net assets relative to their economic value. We identify in the first column of the table three sources of such an understatement: The first source, C_1 is the failure of the financial reporting system to capture the positive present value of projects and subsequent increases in the value of assets; C_2 is the minimization of the firm's assets that appear on the balance sheet; and C_3 is the more timely recognition of losses relative to gains. The features of financial reporting that contribute to these three sources of conservatism are provided in the second column. The third and fourth columns of the table indicate the extent of discretion available to standard setters, regulators, and management with respect to each of these aspects conservatism.

As this classification suggests, the historical cost convention, the choices of accounting methods and estimates within this convention, and the asymmetric recognition rules for gains versus losses discussed above all combine to yield a conservative (understated) valuation of assets and equity.²² This classification allows us to trace the links between the different sources of conservatism and identify the extent of discretion available to preparers of financial statements and standard setters in determining the level of reporting conservatism.

One domain of financial reporting where management, auditors, and standard setters have considerable discretion within the historical cost framework is the prescription of certain accounting methods and the choice of methods and estimates. Another domain with lesser discretion is the timing of gain and loss recognition, the aspect captured by the DT measure.

There is likely to be a negative association between the differential timeliness of reporting gains and losses and other manifestations of conservatism. For example, "unconditional conservatism" in the form of unduly pessimistic estimates of bad debt provisions or the life expectancy of long-lived assets, or in the form of a particular cost-allocation schemes (such as LIFO), likely leads to less pronounced timeliness differentials between loss and gain recognition. In contrast, the earnings of firms that engage in aggressive reporting in the form of extensive capitalization and inadequate provisions for future costs or losses will be more "time-sensitive" to the recognition of unfavorable economic events and, therefore, exhibit a greater degree of "conditional conservatism" (i.e., have a higher DT measure).

This discussion suggests that, other things being equal, the greater the unconditional conservatism, the less pronounced the difference in the response of earnings to bad versus good news.²³ This does not necessarily mean, however, that empirically the DT measure is negatively correlated with the other aspects of conservatism. For example, firms that employ pessimistic estimates in their financial reporting (thus undervaluing their assets) may also incorporate adverse economic developments in earnings much faster than they do favorable

²² Other, somewhat overlapping classifications of conservatism exist. For example, conservatism can be classified into "income statement conservatism" or "balance sheet conservatism" (e.g., ARB No. 2, AICPA 1939; Ball et al. 2000), "economic value-added" (resulting from investment in positive NPV projects) or "accounting value-added" (Easton and Pae 2004), "ex ante" conservatism (the undervaluation of recorded assets), or "ex post" conservatism (the understatement of income due to the deferred recognition of gains relative to losses) (Pope and Walker 2002).

²³ Beaver and Ryan (2005) model the relationship between these two distinct concepts of conservatism. Their model captures the probabilistic and history-dependent nature of conditional conservatism.

news. Further, legal and institutional factors (such as the link between tax reporting and financial reporting found in code law countries) may affect the various dimensions of conservatism differently. Thus, the association between the DT measure and other dimensions of conservatism is an empirical issue.

The lack of a positive association (and, in fact, the presence of a negative association) between the DT measure and other measures of conservatism has recently been noted by Ball et al. (2000), Basu (2001), Frances et al. (2004), Giner and Rees (2001), Hanna (2003), Pae et al. (2005), Pope and Walker (2002), and modeled by Beaver and Ryan (2005) and Roychowdhury and Watts (2005). We provide additional evidence about the intercorrelation among a number of proxies of conservatism used in previous research. These are the ratio of the book value of operating assets to their market value, the amount of “unrecorded reserves” examined by Penman and Zhang (2002), and the two conservatism measures developed by Easton and Pae (2004). Penman and Zhang (2002) measure the “unrecorded reserves” as the sum of the hypothetical advertising and R&D assets and the LIFO reserve, deflated by total operating assets. Easton and Pae’s (2004) first measure of conservatism is that induced by investment in positive present value projects. Their second measure provides an estimate of the undervaluation of the book value of assets arising from accounting rules.²⁴ Easton and Pae’s (2004) two measures are operationalized as the sensitivity of the firm’s current return to the change in cash investments and the lagged change in operating assets, respectively.²⁵ Each of the measures attempts to capture only one of the various aspects of conservatism. However, their association with the DT measure provides evidence as to whether the reliance on a single measure to assess the full extent of reporting conservatism is sufficient to draw conclusions about the level of overall conservatism.

Table 12 presents the Pearson and Spearman rank-order correlation coefficients across 16 industry groups between the four measures of conservatism. The table shows that the DT measure is negatively related to the other measures of conservatism. For industries where reporting is characterized by the DT measure as relatively conservative, each of the alternative measures classifies their reporting as relatively aggressive. This negative correlation suggests that the DT measure captures a unique aspect of conservatism not reflected in other measures.

Some studies rely on the DT measure as the only or the main measure to characterize differences in the degree of conservatism of reporting regimes, such as countries, periods, or industries (see, for example, Gul et al. 2002; Kwon 2002; Sivakumar and Waymire 2003) or to proxy for the overall conservatism level in researching other issues (e.g., the determinants of cost of capital [Francis et al. 2004]). The negative correlation between the DT measure and other dimensions and measures of conservatism suggests that relying on any single measure is likely to lead to the wrong characterization of the overall conservatism level.²⁶ However, because the DT measure is the most commonly used measure, the negative correlation that it exhibits with other dimensions of conservatism is of particular importance.

²⁴ This measure is close in spirit to Penman and Zhang’s (2002) “unrecorded reserves” measure and to the type of accounting conservatism stemming from the choice of accounting methods (see Hagerman and Zmijewski 1981).

²⁵ The change in cash investment is derived from the Statement of Cash Flows as capital expenditures net of proceeds from sale of property, plant, and equipment, plus acquisitions minus other investing activities.

²⁶ Some of these concerns are echoed by recent studies (see Beaver and Ryan 2004; Giner and Rees 2001; Hanna 2003; Pope and Walker 2002; Watts 2003b).

TABLE 12
Association between Differential Timeliness (DT) Measure and Other Measures of
Conservatism: Mean Correlation Coefficients across Industries^{a,b}

	DT Measure ^c	Market-to-Book of Operating Assets	Conservatism Due to Present Value Investments ^d	Conservatism Due to Accounting Rules	Conservatism as Measured by "Hidden Reserves" ^e
DT Measure	1.000	-0.241 (0.368)	-0.235 (0.380)	-0.269 (0.313)	-0.343 (0.194)
Market-to-Book of Operating Assets	-0.405 (0.118)	1.000	0.887 (0.000)	0.816 (0.000)	0.256 (0.338)
Conservatism Due to Present Value Investments	-0.457 (0.075)	0.076 (0.778)	1.000	0.854 (0.000)	0.311 (0.241)
Conservatism Due to Accounting Rules	-0.437 (0.090)	0.048 (0.858)	0.614 (0.011)	1.000	0.112 (0.791)
Conservatism as Measured by "Hidden Reserves"	-0.294 (0.267)	0.353 (0.180)	0.229 (0.392)	0.031 (0.909)	1.000

^a Pearson (Spearman) correlation coefficients are presented above (below) the diagonal. Probability levels are provided in parentheses.

^b Firms are divided into 16 industry groups as used in Easton and Pae (2004). These are: Agriculture, Mining and Construction, Food, Textiles and Printing, Chemicals, Pharmaceuticals, Extractive Industries, Durable Manufacturing, Computers, Transportation, Utilities, Retail, Financial Institutions, Insurance and Real Estate, Services and Others. The mean industry values of the variables over the years 1988–2001 are correlated.

^c The DT measure is the β_2 coefficient from Regression (1):

$$EPS_j/Price_{j-1} = \alpha_0 + \beta_0 * DUM_{jt} + \beta_1 * Return_{jt} + \beta_2 * (DUM_{jt} * Return_{jt}) + \epsilon_{jt}$$

^d Conservatism arising from present value investments and resulting from accounting rules is estimated by Easton and Pae (2004) as the sensitivity of the current return to, respectively, the change in cash investments and the lagged change in operating assets. Specifically, these are the coefficients from the following equation:

$$ret_{jt} = \beta_0 + \beta_1 \frac{x_{jt}}{P_{jt-1}} + \beta_2 \frac{\Delta x_{jt}}{P_{jt-1}} + \beta_3 \frac{d_{jt-1}}{P_{jt-1}} + \beta_4 \frac{\Delta ci_{jt}}{P_{jt-1}} + \beta_5 \frac{\Delta oa_{jt-1}}{P_{jt-1}} + \epsilon_{jt}$$

where *ret* is the return, *x* is comprehensive income, *d* is the sum of cash dividends and net capital contributions, *c* is cash investment, and *oa* is the operating assets. The subscript *j* denotes an observation for firm *j*. The cross-sectional regressions are run separately for each year of available data. β_4 captures the effect of conservatism due to future positive NPV projects, and β_5 captures the effect of conservatism due to accounting rules.

^e "Hidden reserves" are defined by Penman and Zhang (2002) as the sum of the LIFO reserve, the capitalized value of R&D and advertising expenses, deflated by operating assets.

VIII. SUMMARY AND CONCLUDING REMARKS

Basu (1997) helped stimulate considerable research on accounting conservatism and his proposed differential timeliness measure makes a significant contribution to the research on financial reporting and its economic consequences. The main message from our paper is that the use of the measure in different research settings should be more selective and qualified.

We identify a number of features of the DT measure that raise questions about its interpretation as a gauge of conservatism. First, the measure uses aggregated measures of earnings and returns. This “aggregation effect” unduly influences the magnitude of the DT measure. The nature of the economic events occurring during the period and the firms’ disclosure policies, factors unrelated to conservatism, also affect the magnitude of the DT measure.

We demonstrate that the use of the DT measure leads to anomalous results. In particular, the measure fails to detect conservatism in instances where it is likely to exist. Further, it indicates a high degree of volatility in the level of reporting conservatism over periods as short as a quarter when the degree of conservatism is expected to be fairly stable.

We also note, as have past studies, that when conservatism is defined as the undervaluation of assets relative to their economic value, it has other sources or dimensions beyond the differential timeliness of gain and loss recognition. We add to the evidence on the negative relation between the DT measure and other dimensions of conservatism, concluding that the measure should be used in conjunction with other conservatism measures in drawing inferences about the extent of reporting conservatism present in an examined sample.

The implications of the limitations of the DT measure identified in this study differ across research settings. Since the aggregation effect is more severe as more events are aggregated (see Table 1 and Figure 1), its seriousness is a function of the length of the period examined. It is therefore likely to be more pronounced in annual data than in quarterly data. Further, the nature of the economic events during the period may vary more across firms in different industries than within industries. For example, in some industries (e.g., the pharmaceutical industry), price-moving events that have no immediate effect on earnings under any interpretation of GAAP (such as an FDA approval, development breakthroughs) are more common than in other industries (e.g., banking). We provide evidence that the relative frequency of such events affects the DT measure. In general, studies that focus on assessing the relative conservatism of firms during a short period within a single industry are less likely to be affected by the concerns regarding the sensitivity of the DT measure to the information environment.

Studies that compare the degree of conservatism between countries are more susceptible to the concerns raised here. Countries differ widely in the degree of development of their capital markets and, hence, in the nature of the information flow. Less developed markets are likely to be characterized by less uniform, more discrete news arrivals. Further, the different legal and regulatory environments of different countries are bound to affect management disclosure policies and, therefore, the DT measure without implying anything about the conservative stance of the reporting firms.

Regardless of the sample being examined, the DT measure relies on a number of key assumptions (e.g., about the nature of the events during the period) and therefore should, at a minimum, utilize a research design that controls for certain information effects (e.g., dominating news events). Finally, the substitution effect between the different aspects of conservatism, which suggests that the DT measure captures only a portion of the overall conservatism of firms, should be recognized.

The results of this paper do not invalidate the notion that an important manifestation of reporting conservatism is the differential timeliness of the earnings response to good versus bad news. To the contrary, this notion is very reasonable and runs to the heart of the conservatism principle. What the evidence does indicate, however, is that the differential timeliness measure likely suffers from considerable measurement errors that exceed those found in other measures of conservatism, as well as other measures commonly used in

capital market research such as the earnings response coefficient or beta, which are presented for illustrative purposes. Given the recent reliance on the differential timeliness measure to assess conservatism for various samples of firms, time periods, and countries, we hope that our critical evaluation of its properties contributes to future research on reporting conservatism.

APPENDIX A

Simulating the Effect of Aggregating Economic Events on the Differential Timeliness (DT) Measure

This simulation is designed to examine how aggregating conservatively reported economic events in earnings impacts the DT measure. The results of the simulation are reported in Table 1. We simulate earnings and returns for single- and multiple-event periods as follows.

Single-Event Periods

We first assume that a single shock (a favorable or unfavorable economic event) occurs each period. The shock is distributed either $N(-1.0, 0.2)$ or $N(+1.0, 0.2)$ with an equal probability of occurrence.

Conservatism is introduced by generating a differential response of earnings to positive versus negative shocks. Specifically, if the shock is less than zero (i.e., an unfavorable economic event occurs), then the return is distributed $N(\text{shock}/10, 0.01)$ and earnings is set equal to the shock. Thus, negative information is incorporated immediately in earnings. In contrast, if the shock is greater than 0 (i.e., a favorable economic event occurs), then the return is distributed $N(\text{shock}/10, 0.01)$ and earnings is distributed $N(1, 0.2)$.

The above algorithm is used to generate 100,000 pairs of periodic returns and earnings. Regression (1) is then used to estimate the DT measure from the resulting data. This process is repeated 1,000 times.

Multiple-Event Periods

We generate returns and earnings for multiple-event periods by accumulating the individual events' returns and earnings each period. Using the returns and earnings in the multiple-event periods as observations, we re-estimate Regression (1).

To examine the effect of the distribution of the shocks' magnitude on the measured conservatism, we repeat the above simulation, allowing a certain proportion of the shocks (varying from 10 percent to 90 percent) to be drawn from a more volatile (higher variance) distribution than that of the rest of the shocks. Specifically, the "more volatile" distribution is $N(-K, K/5)$ or $N(+K, K/5)$, where K is alternately 10, 25 and 50, with an equal probability.²⁷

APPENDIX B

Simulating the Effect of "Leading" Economic Events on the Differential Timeliness (DT) Measure

This simulation is designed to examine how positive and negative economic events that precede financial reporting under GAAP affect the DT measure. The results of the simulation are reported in Table 4.

²⁷ We also ran the simulations with shocks being distributed $N(0,1)$. Note that under this alternative specification, both the sign and the magnitude of the shock are determined in one step. For this specification, we define the "more volatile" distribution as $N(0,K)$ with K receiving the value of, alternately, 2, 5, and 10. This specification of the shocks does not affect our main findings reported in the "Aggregation Effect" section and Table 1.

We define the following two types of economic events:

- Positive: Events that have a positive effect on the current period's returns, but no effect on the current period's earnings.
- Negative: Events that have a negative effect on the current period's returns, but no effect on the current period's earnings.

We assume single-shock periods and simulate the economic shock, the return, and the earnings of 100,000 firm-period observations. The base simulation assumes, alternatively, that earnings are reported neutrally (i.e., positive and negative news events are reported on an equally timely basis) and (2) earnings are reported conservatively (i.e., negative news events are reported on a more timely basis than are positive news events). In each successive simulation, we replace a fraction, Q , of the default observations with observations representing an event of a particular type (positive or negative) and determine the DT measure by estimating Regression (1) on the simulated data.

The functions used to generate the shocks, returns and earnings are provided below:

Under Neutral Reporting

The period shock is distributed either $N(-.0, 0.2)$ or $N(+1.0, 0.2)$ with an equal probability of occurrence. Returns and earnings are distributed $N(\text{shock}/10, 0.01)$ regardless of the sign of the shock.²⁸

Under Conservative Reporting

The period shock is distributed either $N(-.0, 0.2)$ or $N(+1.0, 0.2)$ with an equal probability of occurrence. For negative shocks, returns and earnings are distributed $N(\text{shock}/10, 0.01)$. For positive shocks, the return is distributed $N(\text{shock}/10, 0.01)$ and earnings are distributed $N(0.5 \text{ times the shock}/10, 0.01)$.

The process used to generate observations that belong to each of the two types of events is described below. Unless otherwise specified, these observations are generated in the same manner for neutral or conservative reporting.

Positive events:

- (a) The shock is distributed as described in the default simulations above.
- (b) If the shock is negative, then the return is distributed $N(\text{shock}/10, 0.01)$ and earnings are distributed $N(\text{shock}/10, 0.01)$.
- (c) If the shock is positive, then the return is distributed $N(\text{shock}/10, 0.01)$ and earnings are set to equal 0.

Negative events:

- (a) The shock is distributed as described in the default simulations above.
- (b) If the shock is negative, then the return is distributed $N(\text{shock}/10, 0.01)$ and earnings are set equal to 0.
- (c) If the shock is positive, then the return is distributed $N(\text{shock}/10, 0.01)$ and earnings are distributed:
 - (1) $N(\text{shock}/10, 0.01)$ if the base simulation assumes neutral reporting.
 - (2) $N(0.5 \text{ times the shock}/10, 0.01)$ if the base simulation assumes conservative reporting.

²⁸ Our main findings were not affected when we ran the simulations using a default distribution for the shocks of $N(0,1)$.

We begin with 100,000 observations under each of the two starting points (neutral and conservative reporting). We then replace 10,000, 20,000, and 50,000 of these observations with positive events. We then repeat the same analysis substituting 10,000, 20,000, and 50,000 of the observations with negative events.

APPENDIX C

Classification of Financial Reporting Conservatism by Source, Contributing Features, and Extent of Discretion

Source of Conservatism ²⁹	Financial Reporting Features that Contribute to Conservatism	Extent of Discretion to Influence the Degree of Conservatism Available to:	
		Standard Setters and Regulators	Management
C₁: Failure to capture the positive present value of projects and subsequent increases in value of assets	Historical cost convention coupled with the transaction-based accounting approach and the assumptions of going concern and a stable monetary unit	No discretion under historical cost framework; Discretion on whether to move to a pure market valuation or deviating from historical cost for certain items (e.g., marketable securities) or in certain situations (e.g., hyperinflation periods).	Limited or no discretion
C₂: Minimization of the carrying value of net assets in place	Choices of income-deferring methods and estimates <i>within</i> the historical cost framework	Discretion in prescribing accounting methods (e.g., accounting for R&D, goodwill, executive stock options, revenue recognition criteria, inflation accounting)	Discretion in choosing among acceptable alternative accounting methods; implementing rules (e.g., for loss contingencies, cost capitalization, revenue recognition); making estimates
C₃: More timely recognition of losses relative to gains	Asymmetric treatment of gains and losses through means such as lower of cost or market (i.e., LCM) ³⁰	Discretion in prescribing accounting rules for impairment and loss contingencies Limited discretion to prescribe or prohibit recognition of unrealized gains (e.g., marketable securities)	Discretion in timing and amount of implementing LCM; No discretion in recognizing unrealized gains; Some discretion on classification of securities as trading or available-for-sale ³⁰

²⁹ Conservatism is defined as the understatement of the firm's book value of equity relative to its economic value. The total amount of conservatism present equals the sum of C₁, C₂, and C₃. Additional conservatism (i.e., greater understatement) may arise if stock prices incorporate the value of the abandonment option (see Holthausen and Watts 2001).

³⁰ This has implications for the timeliness of gain and loss recognition.

REFERENCES

- Ahmed, A. S., R. M. Morton, and T. F. Schaefer. 2000. Accounting conservatism and the valuation of accounting numbers: Evidence of the Feltham-Ohlson (1996) model. *Journal of Accounting, Auditing & Finance* 15 (3): 271–292.
- , B. K. Billings, R. M. Morton, and M. S. Harris. 2002. The role of accounting conservatism in mitigating bondholder-shareholder conflicts over dividend policy and in reducing debt costs. *The Accounting Review* 77 (4): 867–890.
- American Institute of Certified Public Accountants (AICPA). 1939. *Unamortized Discount and Redemption Premium on Bonds Refunded*. Accounting Research Bulletin No. 2. New York, NY: AICPA.
- Ball, R., S. P. Kothari, and A. Robin, 2000. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics* 29 (1): 1–51.
- , A. Robin, and J. S. Wu. 2003. Incentive versus standards: Properties of accounting income in four East Asian countries. *Journal of Accounting and Economics* 30 (1–3): 235–270.
- , and L. Shivakumar. 2005. Earnings quality in U.K. private firms. *Journal of Accounting and Economics* 39 (1): 83–128.
- Barth, M., and G. Clinch. 1998. Revalued financial, tangible, and intangible assets: Associations with share prices and non-market-based value estimates. *Journal of Accounting Research* 36 (Supplement): 199–233.
- Basu, S. 1997. The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting and Economics* 24 (1): 3–37.
- . 2001. Discussion of: On the asymmetric recognition of good and bad news in France, Germany and the United Kingdom. *Journal of Business Finance and Accounting* 28 (9/10): 1333–1349.
- , L. Hwang, and C. Jan. 2001a. Auditor conservatism and quarterly earnings. Working paper, Baruch College–CUNY.
- , ———, and ———. 2001b. Differences in conservatism between Big Eight and Non-Big Eight auditors. Working paper, Baruch College–CUNY and California State University, Hayward.
- Beaver, W., and S. Ryan. 2000. Biases and lags in book value and their effects on the ability of the book-to-market ratio to predict book return on equity. *Journal of Accounting Research* 38 (1): 127–148.
- , and ———. 2005. Conditional and unconditional conservatism: Concepts and modeling. *Review of Accounting Studies* 10: 269–309.
- Beekes, W., P. Pope, and S. Young. 2004. The link between earnings timeliness, earnings conservatism and board composition: Evidence from the U.K. *Corporate Governance: An International Review* 12 (1): 47–59.
- Beneish, M. D. 1999. Incentives and penalties related to earnings overstatements that violate GAAP. *The Accounting Review* 74 (4): 425–257.
- Bhushan, R. 1989. Firm characteristics and analysts following. *Journal of Accounting and Economics* 11 (2–3): 255–274.
- Bushman, R. M., and J. D. Piotroski. 2006. Financial reporting incentives for conservative accounting: The influence of legal and political institutions. *Journal of Accounting and Economics* 42 (1–2): 107–148.
- Cao, Y., and C. J. Lee. 2002. Asymmetry in earnings-returns relations: The case of China. Working paper, University of Rochester.
- Chambers, A., and S. Penman. 1984. Timeliness of reporting and the stock price reaction to earnings announcements. *Journal of Accounting Research* 22 (1): 21–47.
- Chandra, U., C. Wasley, and G. Waymire. 2004. Income conservatism in the U.S. technology sector. Working paper, University of Rochester.
- Chaney, P., and K. Philipich. 2003. The price-earnings relation in troubled times: The case of Arthur Andersen. Working paper, Vanderbilt University and The Ohio State University.

- Cho, S., R. Hagerman, S. Nabar, and E. Patterson. 2003. Measuring stockholder materiality. *Accounting Horizons* 17 (Supplement): 63–76.
- DeFond, M. L., and M. Hung. 2003. An empirical analysis of analysts' cash flow forecasts. *Journal of Accounting and Economics* 35 (1): 73–100.
- Dietrich, J. R., K. A. Muller, and E. J. Riedl. 2006. Asymmetric timeliness tests of accounting conservatism. Working paper, The Ohio State University, The Pennsylvania State University, and Harvard University.
- Easton, P., and J. Pae. 2004. Accounting conservatism and the relation between returns and accounting data. *Review of Accounting Studies* 9 (4): 495–521.
- Entwistle, G., and F. Phillips. 2003. Relevance, reliability, and the earnings quality debate. *Issues in Accounting Education* 18 (1): 79–92.
- Feltham, G. A., and J. A. Ohlson. 1995. Valuation and clean surplus accounting for operating and financing activities. *Contemporary Accounting Research* 11 (2): 689–731.
- Francis, J., R. Z. LaFond, P. Olsson, and K. Schipper. 2004. Costs of capital and earnings attributes. *The Accounting Review* 79 (October): 967–1010.
- Gigler, F. B., and T. Hemmer. 2001. Conservatism, optimal disclosure policy and the timeliness of financial reports. *The Accounting Review* 76 (4): 471–493.
- Giner, B., and W. Rees. 2001. On the asymmetric recognition of good and bad news in France, Germany and the United Kingdom. *Journal of Business Finance and Accounting* 28 (9/10): 1285–1331.
- Givoly, D., and D. Palmon. 1982. The timeliness of annual earnings announcements: Some empirical evidence. *The Accounting Review* 57 (3): 465–508.
- , and C. Hayn. 2000. The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative? *Journal of Accounting and Economics* 29 (3): 287–320.
- Gul, F. A., B. Srinidhi, and T. Shieh. 2002. The Asian financial crisis, accounting conservatism and audit fees: Evidence from Hong Kong. Working paper, City University of Hong Kong.
- Hagerman, R. L., and M. E. Zmijewski. 1979. Some economic determinants of accounting policy choices. *Journal of Accounting and Economics* 1 (2): 141–161.
- , and ———. 1981. An income strategy approach to the positive accounting theory. *Journal of Accounting and Economics* 3 (2): 129–149.
- Hanna, D. 2003. Conservatism and accounting measurement. Working paper, University of Chicago.
- Holthausen, R., and R. Watts. 2001. The relevance of the value-relevance literature for financial accounting setting. *Journal of Accounting and Economics* 31 (1–3): 3–75.
- Huijgen, C., and M. Lubberink. 2005. Earnings conservatism, litigation, and contracting: The case of cross-listed firms. *Journal of Business Finance & Accounting* 32 (7/8): 1275–1310.
- Jensen, M. C., and R. S. Ruback. 1983. The market for corporate control: The scientific evidence. *Journal of Financial Economics* 11 (1–4): 5–51.
- Jindrichovska, I., and D. Kuo. 2003. Timeliness of earnings in the Czech market. Working paper, University of Wales Aberystwyth.
- Joos, P., and M. Lang. 1994. The effects of accounting diversity: Evidence from the European Union. *Journal of Accounting Research* 32 (Supplement): 141–168.
- Kelley, S., D. Shores, and Y. Tong. 2004. Independence in appearance, earnings conservatism, and prediction of future of cash flows. Working paper, University of Washington.
- Krishnan, G. 2003. Did Houston clients of Arthur Andersen recognize publicly available bad news in a timely fashion? Working paper, City University of Hong Kong.
- . 2005. The association between Big 6 auditor industry expertise and asymmetric timeliness of earnings. *Journal of Accounting Auditing & Finance* 20 (3): 209–228.
- Kwon, S. S. 2002. Value relevance of financial information and conservatism: High-tech versus low-tech stocks. Working paper, Rutgers University–Camden.
- Leftwich, R. 1995. The agenda of the Financial Accounting Standards Board. Working paper, University of Chicago.

- Livnat, J., and C. E. L. Tan. 2004. Restatements of quarterly earnings: Evidence on earnings quality and market reactions to the originally reported earnings. Working paper, New York University.
- McNichols, M. 1988. A comparison of the skewness of the stock return distributions at earnings and non-earnings announcement dates. *Journal of Accounting and Economics* 10: 239–273.
- Miller, G. 2002. Earnings performance and discretionary disclosure. *Journal of Accounting Research* 40: 173–204.
- Pae, J., D. B. Thornton, and M. Welker. 2005. The link between earnings conservatism and the price-to-book ratio. *Contemporary Accounting Research* 22 (3): 693–717.
- Pany, K., and S. Wheeler. 1989. Materiality: An inter-industry comparison of the magnitudes and stabilities of various quantitative measures. *Accounting Horizons* 3 (4): 71–78.
- Peek, E., W. Buijink, and L. Coppens. 2004. Accounting conservatism in the European Union: The influence of institutions and incentive. Working paper, University of Maastricht.
- Penman, S. 1980. An empirical investigation of the voluntary disclosure of corporate earnings forecasts. *Journal of Accounting Research* 18 (Spring): 132–160.
- , and X. Zhang. 2002. Accounting conservatism, the quality of earnings and stock returns. *The Accounting Review* 77 (2): 237–264.
- Pope, P., and M. Walker. 1999. International differences in timeliness, conservatism and classification of earnings. *Journal of Accounting Research* 37 (Supplement): 53–99.
- , and ———. 2002. Ex-ante and ex-post accounting conservatism, asset recognition and asymmetric earnings timeliness. Working paper, Lancaster University and University of Manchester.
- Rangan, S. 1998. Earnings management and the performance of seasoned equity offerings. *Journal of Financial Economics* 50 (1): 101–122.
- Raonic, I., S. McLeay, and I. Asimakopulos. 2004. The timeliness of income recognition by European companies: An analysis of institutional and market complexity. *Journal of Business Finance & Accounting* 31 (1–2): 151–165.
- Richardson, V. J. 1997. An empirical investigation of the relationship between information asymmetry and earnings management. Unpublished dissertation, University of Illinois at Urbana-Champaign.
- Roychowdhury, S., and R. Watts. 2005. Asymmetric timeliness of earnings, market-to-book and conservatism in financial reporting. Working paper, Massachusetts Institute of Technology.
- Ruddock, C., S. Taylor, and S. Taylor. 2004. Non-audit services and earnings conservatism: Is auditor independence impaired? Working paper, University of Technology, Sydney, Australia.
- Ryan, S., and P. Zarowin. 2003. Why has the contemporaneous linear return-earnings relation declined? *The Accounting Review* 78 (2): 523–553.
- Sivakumar, K., and G. Waymire. 2003. Enforceable accounting rules and income measurement by early 20th century railroads. *Journal of Accounting Research* 41 (2): 397–444.
- Shivakumar, L. 2000. Do firms mislead investors by overstating earnings before seasoned equity offerings? *Journal of Accounting and Economics* 29 (3): 339–371.
- Skinner, D. 1994. Why firms voluntarily disclose bad news. *Journal of Accounting Research* 32: 38–60.
- . 1997. Earnings disclosure and stockholder lawsuits. *Journal of Accounting and Economics* 23 (3): 249–283.
- Staubus, G. 1985. An induced theory of accounting measurement. *The Accounting Review* 60 (1): 53–75.
- Stober, T. L. 1996. Do prices behave as if accounting book values are conservative? Cross-sectional tests of the Feltham-Ohlson [1995] valuation model. Working paper, University of Notre Dame.
- Tazawa, M. 2003. The timeliness of earnings and accruals under conservatism in Japan. Working paper, Nagoya City University.
- Teoh, S. H., I. Welch, and T. J. Wong. 1998. Earnings management and the long-run market performance of initial public offerings. *Journal of Finance* 53 (6): 1935–1974.
- Watts, R., and J. Zimmerman. 1986. *Positive Accounting Theory*. Englewood Cliffs, NJ: Prentice Hall.

Uniformity versus Flexibility: Evidence from Pricing of the Pension Obligation

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ABSTRACT: We functionally derive the discretionary component of the pension obligation (PBO) based on deviation of actuarial assumptions—discount rate and compensation growth rate—from their respective industry medians. We then examine the implications of allowing discretion in the choice of pension assumptions on the pricing of the PBO. We find no evidence that discretion—as currently allowed under U.S. GAAP—impairs the value relevance of the PBO. We also find that the discretionary component is incrementally value-relevant beyond the nondiscretionary component. Additional analyses suggest that these results are unlikely attributable to market fixation on reported PBO or measurement error in our discretionary component. Overall, we find that imposing uniformity in the choice of pension assumptions, on average, prevents communication of value-relevant information through the PBO.

Keywords: *value relevance; pensions; discretion; flexibility; uniformity; earnings management; managerial opportunism; information communication.*

Data Availability: *The data used in this study are publicly available from the sources indicated in the text.*

I. INTRODUCTION

There is an ongoing debate over “uniformity versus flexibility” in financial accounting. Some argue the flexibility afforded by Generally Accepted Accounting Principles (GAAP) allows managers to opportunistically manipulate financial reports, as evidenced by a large earnings management literature. Others believe flexibility facilitates efficient contracting (e.g., Watts and Zimmerman 1986) and improves private information communication through financial reports (e.g., Healy and Palepu 1993). This tension is best

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described by Dye and Verrecchia (1995, 390): “Whether expanding discretion in accounting choice is desirable appears to depend on whether the prospects for improved communication of the firm’s financial condition are more than offset by the effects of managerial opportunism.” Ultimately, whether flexibility (discretion) improves or impairs the quality of financial accounting information is an empirical question.

In this paper we examine the effects of discretion, as currently allowed under U.S. GAAP, on the value relevance of the pension obligation. The measurement of the projected benefit obligation (PBO)—the pension obligation for defined benefit plans—is a complex process that involves making a number of actuarial assumptions, of which the discount rate and compensation growth rate are the most important. Accordingly, our research question is as follows: Does the discretion currently allowed under U.S. GAAP in the choice of pension (actuarial) assumptions—the discount rate and compensation growth rate—improve or impair the value relevance of the PBO? To address this question, we construct a measure of “nondiscretionary” PBO by replacing the firms’ discount rate and compensation growth rate assumptions with their respective industry medians. The difference between reported PBO and our measure of nondiscretionary PBO is our estimate of the discretionary component. We then examine the value relevance of the estimated discretionary component of the PBO through price association regressions.

We choose to study the PBO for several reasons. First, prior studies (e.g., Subramanyam 1996) have addressed a similar research question by examining the pricing of discretionary accruals. The inferences from these studies, however, are questionable because discretionary accruals are subject to considerable measurement error (Bernard and Skinner 1996; Guay et al. 1996). The advantage of studying the PBO is that the assumptions used in determining the PBO are disclosed in footnotes; hence, it is possible to estimate a discretionary component that is likely less susceptible to measurement error than discretionary accruals.¹ Second, it is widely accepted that defined benefit pension accounting allows considerable managerial discretion and is a fertile area for manipulation (e.g., Gopalakrishnan and Sugrue 1995). However, variation in pension assumptions also reflects economic differences in pension plans (Blankley and Swanson 1995). Therefore, the PBO provides an ideal setting to examine the trade-off between the costs and benefits of allowing discretion in financial accounting choices. Finally, pension obligations are economically significant for the purpose of this study because they are large in magnitude and are sensitive to actuarial assumptions.

Using a large sample over 1991–2003, we perform both relative and incremental price association tests for evaluating the value relevance of the discretionary PBO component. Our relative price association tests compare the explanatory power of non-nested regressions of market value on pension and nonpension assets and liabilities (and a vector of controls) that alternatively use the reported PBO and our measure of nondiscretionary PBO as the pension liability. Our incremental price association tests examine whether the market incrementally attaches value to the discretionary component of the PBO beyond the nondiscretionary component. We find no difference in explanatory power (or in the pricing coefficient on the pension obligation) across the discretionary and nondiscretionary models in our relative price association regressions. However, we find that the discretionary component is incrementally valued by the market in a similar manner to the nondiscretionary

¹ Other studies have also used specific accruals to examine the value relevance of the discretionary component. For example, Beaver and Engel (1996) examine the pricing of the discretionary component of loan loss reserves for commercial banks. Discretionary component of specific accruals is arguably less prone to measurement error than discretionary accruals. As we discuss later, our methods have the added advantage that we functionally (rather than statistically) estimate the discretionary component.

component in the incremental price association regressions. Overall, our results suggest that (1) discretion—as currently allowed under U.S. GAAP—does not impair the value relevance of the PBO; and (2) the discretionary component is incrementally value-relevant. Thus, our results are consistent with discretion in the choice of pension assumptions, on average, facilitating the communication of value-relevant information through the reported PBO.

Our results are subject to two alternative explanations: (1) measurement error in our discretionary PBO proxy causes our pricing results to arise spuriously; and (2) the discretionary component of the PBO is priced because the market fixates on reported PBO without appreciating the differential (if any) value relevance of the discretionary and nondiscretionary components. Measurement error in our setting could arise because (1) our estimate of discretionary PBO could reflect the effects of deviations in pension assumptions from their respective industry medians with error; and (2) industry medians are inappropriate benchmarks. Several diagnostic tests suggest that our discretionary PBO proxy reflects the effects of deviation in pension assumptions accurately. However, we are unable to test the appropriateness of industry-based benchmarks, although sensitivity analysis with alternative benchmarks does not alter our inferences. Regarding the market mispricing explanation, Aboody et al. (2002) conclude that market inefficiency does not materially affect inferences in value relevance studies that use a price (levels) specification such as ours. Moreover, our tests of future abnormal returns suggest that there is unlikely any market mispricing related to the discretionary PBO component. Nevertheless, we substitute price with a measure of *ex post* intrinsic value as a proxy for firms' fundamental value and show that our results are qualitatively similar to those using contemporaneous stock price, both for the relative and the incremental analyses.²

Our findings contribute to the ongoing debate on “uniformity versus flexibility” in accounting standard setting. We show that allowing flexibility (discretion) in the choice of pension assumptions—as currently allowed under U.S. GAAP—on average improves information communication through the PBO. Our results are consistent with the benefits of allowing discretion, i.e., private information communication, outweighing the costs, i.e., opportunistic manipulation. Thus, our study complements prior research by examining the pricing implications of discretionary choices in a unique setting. Given the importance of the research question and the measurement problems inherent with estimating the discretionary component, our paper contributes to the literature by using an alternative methodology that is likely less susceptible to the measurement error problem.

Our analyses are subject to several caveats. First, while the PBO offers several advantages for examining our research question, its major drawback is that it is a balance sheet item (rather than an income statement item) that is presently not recognized on the financial statements. Although prior research (e.g., Barth 1991) shows that footnote disclosures of pension obligations are priced by the market in a similar manner to other liabilities on the balance sheet, it is possible that market pricing of disclosed items may differ from those recognized on the financial statements. Besides, examining the pricing implications of a balance sheet item does not fit the traditional notion of “earnings” management. Thus, our paper adopts a broader definition of discretion than that adopted by much of the prior

² In the spirit of Aboody et al.'s (2002) suggestion, we measure *ex post* intrinsic values as the present value of three future years of dividends and three-year-ahead market price.

literature, which largely focuses on earnings management.³ Second, similar to other papers that examine specific accruals choices (e.g., Wahlen 1994), our results may not apply broadly to all accrual choices. This reduces the generality of our inferences. Third, while we perform alternative tests that control for potential market inefficiency, we cannot completely rule out the stock market's functional fixation on reported PBO as an alternative explanation for our results. This is because pension obligations are long-term in nature and it is difficult to control for mispricing that persists over many years. Fourth, our basis for evaluating the benefits of discretion is through association with stock price. Holthausen and Watts (2001) criticize value relevance research that examines standard-setting issues through association with stock price/returns. While acknowledging this criticism, we note that we are not using stock price as the basis for addressing a specific standard-setting issue. Rather, we merely use stock price as a proxy for determining whether economically relevant information is communicated through discretionary choices.

Finally, our inferences are sensitive to our choice of industry-based benchmarks for defining uniformity (or discretion). Specifically, we conclude that imposing uniformity in the selection of pension assumptions impairs information communication through the PBO. However, this inference depends crucially on the particular form of uniform accounting adopted. We define uniformity at the industry level. The choice of industry for determining uniformity appears appropriate based on institutional evidence. One can, however, visualize a richer uniform accounting regime that allows more firm-specific details than that captured at the industry-level. If such a regime can be successfully implemented (without the moral hazard problems that characterize flexible accounting), it is possible that it may be more informative than a regime that allows flexibility such as the U.S. GAAP.

The rest of the paper is organized as follows. Section II motivates our research question. Section III discusses sample, research design, and provides descriptive analysis. Section IV presents our empirical results. Section V explores alternative explanations and Section VI concludes.

II. MOTIVATION AND DISCUSSION

In addition to widespread allegations in the financial press, academic research documents a vast body of evidence relating to opportunistic earnings management. (See Schipper [1989], Healy and Wahlen [1999], and McNichols [2000] for reviews of the earnings management literature.) Even managers admit they routinely manage earnings for opportunistic reasons (Graham et al. 2006). Evidence of managers misusing the discretion allowed by GAAP raises questions about the desirability of allowing flexibility in financial reporting. However, it is not clear whether the alternative, i.e., eliminating flexibility through some form of uniform accounting, will make accounting numbers more informative. Flexible accounting rules allow firms to contract more efficiently (Watts and Zimmerman 1986) and to communicate value-relevant private information through accounting numbers (Schipper 1989; Healy and Palepu 1993; Sankar and Subramanyam 2001). The ongoing "uniformity versus flexibility" debate in accounting standard setting, therefore, involves trading off the relative benefits of allowing discretion, i.e., improved private information communication, with its costs, i.e., opportunistic manipulation (Dye and Verrecchia 1995).

³ Balance sheet management is recently starting to attract attention from both academics (Gramlich et al. 2001) and practitioners (Lundelius 2003). Research also shows that footnote information is manipulated (Bartov et al. 2004) and in particular the pension obligation (e.g., Asthana 1999). Besides, recent SEC investigations suggest that regulators are specifically concerned about PBO manipulation through discount rate assumptions (Schultz 2004).

Given its importance to standard setting, there are surprisingly few empirical studies that examine whether discretion improves or impairs the quality of financial reporting. Subramanyam (1996) documents that the stock market prices discretionary accruals, which suggests that discretion on average enhances the value relevance of earnings. Hunt et al. (1998) show that income smoothing is associated with higher price-earnings multiples, while Tucker and Zarowin (2006) show that discretionary income smoothing improves the informational efficiency of stock prices. The evidence from these studies, however, is inconclusive because measurement error in the discretionary accruals proxy could spuriously induce discretionary accruals to be priced. For example, Bernard and Skinner (1996) point out that measurement error can induce the discretionary accruals proxy to contain a large nondiscretionary component. Also, Guay et al. (1996) show that models that decompose accruals into discretionary and nondiscretionary components (including the Jones 1991 model and its variants, which are used by most papers in this genre) are subject to such large measurement error that they are indistinguishable from a random decomposition of accruals. In either case, the pricing results of Subramanyam (1996) and others could arise simply through measurement error in the discretionary accruals proxy.

One approach to reducing measurement error in the discretionary accruals proxy is modeling specific accrual choices (McNichols 2000). For example, researchers have modeled the discretionary component of loan loss reserves/provisions in commercial banks (e.g., Wahlen 1994; Beaver and Engel 1996; Beaver and Venkatachalam 2003) and loss reserves in property casualty insurance companies (e.g., Petroni et al. 2000; Beaver and McNichols 1998, 2001).⁴ While it is difficult to identify a specific accrual that is economically significant for this purpose, the advantage of this approach is that it allows researchers to exploit their knowledge of GAAP and the economic determinants of the specific accrual to model the nondiscretionary component more accurately.

In this paper we examine the value relevance of a specific accrual that is subject to managerial discretion: the projected benefit obligation (PBO) of defined benefit pension plans. We choose the PBO as the target of our analysis for several reasons. First, pension obligations are large in magnitude and often can exceed 50 percent of the total liabilities of a firm. In addition, the PBO is sensitive to changes in underlying actuarial assumptions.⁵ Taken together, the average magnitude of the PBO and its sensitivity to assumption choices makes it an economically significant item to study for our purpose.

Second, the PBO provides an ideal setting in which to examine the tension between the costs and benefits of allowing discretion in accounting choice. On the one hand, defined benefit pension accounting allows considerable scope for managerial discretion, and is regarded as a fertile area for manipulation (Buffet and Loomis 2002). For example, managers can exercise discretion in choosing pension assumptions such as discount rates and compensation growth rates, both of which have significant impact on the PBO. Several studies (e.g., Blankley and Swanson 1995; Gopalakrishnan and Sugrue 1995; Godwin et al. 1996;

⁴ The evidence regarding the value relevance of the discretionary component from these "specific accrual" studies is mixed. With respect to commercial banks, Wahlen (1994) shows that the discretionary component of loan loss provisions explains future cash flow changes and Beaver and Engel (1996) find that the discretionary component of loan loss reserve is positively associated with prices. Beaver and Venkatachalam (2003) show that market pricing of loan loss reserves and loan fair values depend on signaling or opportunistic motivations of managers. Also, a number of papers have partitioned property casualty insurance companies' loss reserves into discretionary and nondiscretionary components. However, only Petroni et al. (2000) examine pricing implications of discretion in property casualty loss reserves, and find mixed results. Outside the financial sector, Kallapur and Kwan (2004) examine the effect of discretion on the pricing of brand values.

⁵ For example, we estimate that a 1 percent (100 basis points) change in the discount rate would, on average, yield an 11 percent change in PBO in our sample.

Asthana 1999) find that pension assumptions vary considerably across firms and that management's pension assumption choices are influenced by reporting incentives associated with agency considerations. Also, regulators (in particular, the SEC) are concerned that pension assumptions are being used to window dress financial statements (Borrius et al. 2004), especially through the use of high discount rates to reduce PBO values (Schultz 2004). On the other hand, discretion in pension assumptions may be exercised by management to reflect real economic differences among pension plans (e.g., Blankley and Swanson 1995). For example, SFAS No. 87 indicates that the selection of discount rates should be based on current prices for settling the pension obligation.⁶ Therefore, discount rates can vary across firms for at least two reasons. First, the age of the workforce can differ across firms. Assuming an upward-sloping yield curve, firms with an older workforce should use lower discount rates due to the relatively shorter maturity of their pension obligations. Second, interest rates vary across countries. Thus, firms with international operations should use different discount rates based on the relative exposure of their pension plans in various countries. Similarly, compensation growth rates can vary across firms for economic reasons. For example, labor markets are not perfectly competitive and there can be specific skills required in different companies and industries, thereby creating cross-sectional variation in compensation growth rates.

Finally, the most important advantage of studying the PBO is that we are able to use footnote disclosure to *functionally* derive the discretionary component through manipulating pension assumptions. Past methods, including those using specific accruals, *statistically* estimate the discretionary component as the residual from a regression of the accrual on a vector of likely determinants. For example, Jones (1991) models accruals as a function of PP&E and change in sales, and Beaver and Engel (1996) model loan loss reserves as a function of net loan charge-offs, loans outstanding, nonperforming assets, and one-year-ahead change in nonperforming assets. Under such methods, any unexplained portion of the accrual is automatically classified as discretionary. Therefore, measurement error in the discretionary component can arise merely because the model estimating the accrual is incompletely specified, i.e., there are economic determinants of accruals—unrelated to discretion—that have not been modeled (Bernard and Skinner 1996). In contrast, our discretionary component is estimated deterministically as a function of reported pension assumptions—the discount rate and compensation growth rate—and their respective industry median benchmarks. By functionally deriving the discretionary component rather than estimating it as the residual from a regression, our method is not subject to measurement error arising from incomplete model specification.⁷ Of course, our measure of discretionary PBO is not error-free. Measurement error can arise from estimation error and simplifying assumptions in parameters that are used for estimating the discretionary PBO component. However, diagnostic tests (see Section V) suggest that the extent of such measurement error is unlikely material.

⁶ In determining the discount rate, SFAS No. 87 permits consideration of a broad range of factors, including annuity or Pension Benefit Guaranty Corporation (PBGC) interest rates and interest rates on long-term, high-quality, fixed-income investments. In a letter to the EITF in 1993, the SEC specifically suggested using high-quality corporate debt yields as assumed discount rates for pension plans.

⁷ For example, analogous to the Jones (1991) model, we could model the discretionary component of PBO as the residual from the following regression: $PBO = a + b \cdot EMP + e$, where EMP equals number of employees. When estimated in such a manner, any variation in PBO that arises because of factors orthogonal to number of employees—such as wage levels, pension formulae, years of service—will be attributed to the discretionary component. Such a problem does not arise in our methodology that functionally models the discretionary component of the PBO.

While the PBO offers several advantages for examining our research question, its major drawback is that it is a liability (as opposed to an income statement item) that is not recognized on the financial statements.⁸ Therefore, our paper does not examine the implications of earnings management in its narrow sense, but rather implications of a broader concept of “accounts” management, which includes management of balance sheet and footnotes.⁹ Besides, two problems arise when using a mere disclosed (as opposed to recognized) item to test our research question. First, users may not weight disclosed items similarly as recognized items. Prior research (e.g., Barth 1991), however, shows that PBO footnote disclosures are priced by the market in similar manner to other liabilities on the balance sheet. Second, managers may not be interested in manipulating items that are merely disclosed in footnotes. While this is possible, there is evidence suggesting that managers do manipulate pension assumptions that determine the PBO (e.g., Gopalakrishnan and Sugrue 1995) and the SEC is concerned about PBO management (Schultz 2004).

Finally, our definition of the discretionary component is dependent on the particular form of uniform accounting we propose. Therefore, our methodology does not eliminate measurement error in our discretionary component that arises from inappropriate choice of the benchmark. We choose the industry as our benchmark because the largest economic differences across firms are due to industry factors.¹⁰ Our choice of industry as the basis for uniform accounting may be criticized for being too broad to be meaningful because it does not take into consideration myriad economic differences across firms within an industry. An ideal first-best solution would be a system of uniform accounting that incorporates the rich diversity across firms through a system of complex rules. However, such a system will be practically impossible to codify and implement. Therefore, practically the choice is between two second-best solutions: (1) a GAAP that eliminates discretion but imposes arbitrary one-size-fits-all rules (uniformity); or (2) a GAAP that specifies broader principles and allows managers discretion to choose assumptions that best reflect their idiosyncratic economic reality (flexibility). In a sense, our paper compares the costs and benefits of these two second-best solutions—while arbitrary uniformity will eliminate the moral hazard problem, it will also prevent the richness of the firms’ economic reality from being reflected in the accounting numbers (Dye and Verrecchia 1995).

III. SAMPLE, RESEARCH DESIGN, AND DESCRIPTIVE STATISTICS

Sample

Our sample is drawn from all U.S. firms with necessary pension and stock price data available in the Compustat annual industrial, full coverage and research files. We limit our sample to the 1991–2003 time period because data on pension assumptions, such as compensation growth and discount rates, are available in Compustat only after 1990. After excluding all firm-years with sales less than \$10 million, our final sample includes 12,567 firm-years comprising of 1,707 unique firms. For the future-returns analysis, we further

⁸ SFAS No. 87 uses a corridor method to smooth the effects of PBO assumption changes (and actual return on plan assets) on reported pension expense. In order to articulate the balance sheet with the income statement, SFAS No. 87 does not recognize the PBO (or the fair value of plan assets) on the balance sheet. What is recognized instead is accrued or prepaid pension cost.

⁹ A recent survey paper does refer to “accounts” manipulation, rather than earnings manipulation (Stolowy and Breton 2004). Also, recent papers provide evidence of balance sheet management (e.g., Gramlich et al. 2001) and footnote manipulation (Bartov et al. 2004).

¹⁰ Standard-setters also recognize the industry as the logical basis for setting uniform standards (e.g., AICPA issues SOPs that are largely industry-specific). Also analysts often benchmark on industry averages when performing financial statement analysis.

restrict our sample to firms with three-year-ahead monthly stock returns from CRSP. In our regression analysis, we delete 1 percent of observations with the smallest and the largest values of studentized residuals to remove the effect of outliers.

Distribution of Pension Assumptions

Firms can decrease (increase) the PBO by choosing a higher (lower) discount rate or a lower (higher) compensation growth rate. Under SFAS No. 87, firms are required to disclose these pension assumptions in footnotes. Table 1 reports the distribution of discount rate and compensation growth rate assumptions used by our sample firms over the 1991–2003 period. The mean discount rate (r) over our sample period is 7.45 percent. The mean compensation growth rate (g) is 4.84 percent. The cross-sectional variation in both r and g are fairly substantial throughout the sample period, with the by-year standard deviation of r (g) close to 0.60 percent (0.80 percent). The by-year range of r (g) is greater than 5 percent (6 percent) in each of the 13 years, with the largest single-year range up to 11.00 percent (13.00 percent). In short, there is large cross-sectional variation in both r and g , which is much larger than the variation over time. While this large cross-sectional variation could arise from managerial attempts to manage the reported PBO numbers, it is also possible that the variation reflects economic differences in pension plans across firms.

Computation of Discretionary and Nondiscretionary PBO

As mentioned earlier, we compute the discretionary component of the PBO as the difference between the reported PBO (as disclosed in the pension footnote) and an estimate of nondiscretionary PBO. Our estimate of nondiscretionary PBO is determined by substituting the company's assumed discount rate (r) and compensation growth rate (g) with their respective industry medians for each year. Specifically

$$PBO = \frac{P_{r,L}(KW(1+g)^N)}{(1+r)^N} \quad (1)$$

where $P_{r,L}$ is the present value factor of an L period annuity at a discount rate of r , i.e., $r^{-1}(1 - (1+r)^{-L})$, L is the employees' post-retirement life expectancy, K is the proportion of the employees' wages that are payable as pension benefits given current service and vesting, W is the current wage, g is the wage (i.e. compensation) growth rate, and N is the number of years to retirement. Conceptually, PBO is the present value of the projected pension benefit annuity of $KW(1+g)^N$ that is expected to be paid annually over an L -year period after the date of retirement. The projected benefit annuity is simply the proportion of current pension wage component, KW , projected as of the retirement date. Our objective is to estimate the change in PBO due to changes in the discount rate (r) and the compensation growth rate (g). In order to do this, we need to determine the three unknowns in Equation (1): life expectancy (L), years to retirement (N), and the pension wage component (KW).

We assume that life expectancy after retirement is 15 years, i.e. $L = 15$.¹¹ We estimate N by inverting the following relation between PBO and ABO (see Subramanyam and Zhang 2001):

¹¹ The life expectancy for age 65 males during the mid 1990s was between 15 and 16 years. We round it down to 15 years. See the Centers for Medicare and Medicaid Services website: <http://www.cms.hhs.gov>.

TABLE 1
Distribution of Discount Rate and Compensation Growth Rate Assumptions

Discount Rate (<i>r</i>)		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
%															
Mean		8.32	8.15	7.43	8.14	7.43	7.57	7.25	6.82	7.48	7.49	7.15	6.66	6.12	7.45
Std. Dev.		0.63	0.61	0.51	0.62	0.58	0.53	0.56	0.59	0.67	0.63	0.62	0.66	0.56	0.83
Minimum		4.50	4.50	5.00	5.00	4.00	3.50	3.50	3.00	3.00	3.00	2.50	2.00	2.00	2.00
1st Percentile		6.50	5.75	5.75	6.00	5.50	4.50	4.50	5.00	5.10	5.75	5.00	3.75	2.70	5.40
5th Percentile		7.25	7.00	7.00	7.00	7.00	7.00	6.75	6.00	6.50	6.56	6.10	6.00	5.60	6.15
25th Percentile		8.00	8.00	7.10	8.00	7.25	7.50	7.00	6.75	7.25	7.50	7.00	6.50	6.00	7.00
50th Percentile		8.50	8.20	7.50	8.25	7.50	7.50	7.25	6.75	7.50	7.50	7.25	6.75	6.25	7.50
75th Percentile		8.75	8.50	7.50	8.50	7.50	7.75	7.50	7.00	7.75	7.75	7.35	6.75	6.25	8.00
95th Percentile		9.00	9.00	8.50	8.80	8.30	8.00	8.00	7.50	8.00	8.00	7.60	7.25	6.50	8.75
99th Percentile		9.50	9.50	9.00	9.00	9.00	8.50	8.50	8.00	8.25	8.25	8.00	7.50	7.00	9.00
Maximum		10.75	10.00	11.00	14.00	13.00	12.00	12.00	12.50	13.00	13.00	13.00	13.00	11.00	14.00
No. of Obs.		1,048	1,131	1,145	1,132	1,116	1,087	1,056	930	885	806	732	762	737	12,567
Compensation Growth Rate (<i>g</i>)		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
%															
Mean		5.73	5.54	5.05	5.05	4.86	4.79	4.68	4.55	4.60	4.57	4.46	4.22	4.10	4.84
Std. Dev.		0.84	0.80	0.84	0.80	0.87	0.78	0.78	0.82	0.79	0.74	0.71	0.77	0.79	0.91
Minimum		1.00	1.00	1.00	2.00	2.00	2.00	1.30	1.50	2.00	1.20	2.00	0.30	0.20	0.20
1st Percentile		4.00	3.00	3.00	3.00	3.00	3.00	2.50	2.50	2.90	2.50	2.50	2.00	1.90	2.75
5th Percentile		4.50	4.25	4.00	4.00	3.50	3.50	3.50	3.50	3.50	3.50	3.25	3.00	3.00	3.50
25th Percentile		5.00	5.00	4.50	4.50	4.50	4.50	4.00	4.00	4.00	4.00	4.00	4.00	3.74	4.25
50th Percentile		6.00	5.50	5.00	5.00	5.00	5.00	5.00	5.00	4.50	4.50	4.50	4.12	4.00	5.00
75th Percentile		6.00	6.00	5.50	5.50	5.10	5.00	5.00	5.00	5.00	5.00	5.00	4.63	4.50	5.50
95th Percentile		7.00	6.70	6.25	6.25	6.00	6.00	6.00	5.80	5.75	5.50	5.50	5.40	5.13	6.00
99th Percentile		8.50	8.00	7.50	7.50	7.00	6.50	6.50	7.00	6.50	6.00	6.00	6.00	6.00	7.50
Maximum		9.11	8.50	10.00	8.10	15.00	10.00	10.00	10.00	9.00	9.00	9.50	9.50	9.00	15.00
No. of Obs.		1,048	1,131	1,145	1,132	1,116	1,087	1,056	930	885	806	732	762	737	12,567

$$PBO = ABO(1 + g)^N \quad (2)$$

and solving for N :

$$\hat{N} = \frac{\ln(PBO/ABO)}{\ln(1 + g)} \quad (3)$$

where ABO is the accumulated benefit obligation disclosed in footnotes. ABO disclosures were discontinued under SFAS No. 132, which became effective in 1998. Therefore, for firm-years after 1997 we extrapolate N by using the firm-specific median over the 1991–1997 period.¹²

Note that our measure of N is derived from information reflected in the PBO and the ABO . Therefore, it is a composite measure that reflects the effects of assumptions regarding employee turnover and early retirement frequency in addition to the proportion of retirees and the weighted average years to retirement. In other words, it is essentially a measure of the weighted average expected remaining years of service within the organization. As Table 2, Panel B reports, the mean (median) N is 4.2 (3.7) years and a quarter of our sample firm-years have N below 2.3. The low values of N largely reflect the high proportion of retirees in the pension plans and to a lesser extent the effect of employee turnover. Therefore, while our estimate of N is appropriate for measuring the effects of compensation growth, it has measurement error when estimating the effects of discount rates on the PBO .

Using each firm's reported g and r from financial statement footnotes, along with our estimates of L and N , we determine KW as follows:

$$\widehat{KW} = \frac{PBO(1 + r)^{\hat{N}}}{P_{r,15}(1 + g)^{\hat{N}}} \quad (4)$$

With an estimate of KW , we can generate estimates of PBO under various discount and compensation growth rate assumptions by substituting various values for r and g in Equation (1). In our case, we substitute r and g with their respective annual industry medians (where industry is defined based on Fama and French's [1997]) industry classifications) to estimate our measure of nondiscretionary PBO :

$$PBO-X = \frac{P_{r,15}(\widehat{KW}(1 + g^*)^{\hat{N}})}{(1 + r^*)^{\hat{N}}} \quad (5)$$

where r^* and g^* represent industry median discount and compensation growth rates. Finally, the discretionary component of the PBO is determined by subtracting the nondiscretionary component from the reported PBO :

$$PBO-D = PBO - PBO-X. \quad (6)$$

Descriptive Statistics

Table 2, Panel A provides descriptive statistics of general sample characteristics. The mean total assets and market capitalization are \$9.010 and \$4.231 billion (median \$1.195

¹² While measurement error can arise from such extrapolation, we find our estimates of N are fairly stable over time for each firm and, thus, we do not expect such measurement error to be significant.

TABLE 2
Descriptive Statistics^a

	Mean	Std. Dev.	25th Percentile	Median	75th Percentile
Panel A: Sample Characteristics					
Total Assets (\$ million)	9,010.061	38,753.088	307.051	1,195.000	5,058.836
Market Capitalization (\$ million)	4,231.182	15,409.114	161.201	699.266	2,652.320
Market-to-Book	3.182	60.213	1.230	1.753	2.651
Panel B: Measures of Price Association Regressions					
<i>NPTA</i>	2.495	3.388	0.744	1.141	2.386
<i>NPTL</i>	1.934	3.206	0.396	0.726	1.567
<i>PA</i>	0.182	0.200	0.058	0.122	0.238
<i>NI</i>	0.047	0.135	0.016	0.049	0.092
<i>SALEGRW</i>	0.105	0.466	0.009	0.063	0.134
<i>R&D</i>	0.011	0.032	0.000	0.000	0.008
<i>EMP</i> (thousands)	14.682	32.805	1.276	4.000	13.000
<i>PBO</i>	0.175	0.180	0.062	0.123	0.231
<i>PBO-X</i>	0.175	0.180	0.062	0.123	0.230
<i>PBO-D</i>	0.000	0.014	-0.003	0.000	0.003
<i>N</i> (years)	4.227	2.948	2.287	3.716	5.407

^a Our sample consists of 12,567 firm-years from 1991–2003. All variables in Panel B except for *SALEGRW* and *EMP* are deflated by current-year sales.

Variable Definitions:

NPTA = nonpension assets, measured as total assets;

NPTL = nonpension liabilities, measured as total liabilities adjusted for accrued (prepaid) pension cost;

PA = fair-value of pension assets;

NI = income before extraordinary items;

SALEGRW = average sales growth over the previous three years;

R&D = research and development expense;

EMP = number of employees in thousands;

PBO = projected benefit obligation as disclosed in the pension footnote;

PBO-X = nondiscretionary component of *PBO*, estimated using industry-medians of assumed discount rate and compensation growth rate;

PBO-D = discretionary component of projected benefit obligation, i.e., the difference between *PBO-X* and *PBO*; and

N = estimated average number of years to retirement, calculated as $\ln(PBO/ABO) \div \ln(1 + g)$, where *ABO* is the accumulated benefit obligation and *g* is the compensation growth rate disclosed in footnotes.

and \$0.699 billion), respectively. Mean market-to-book ratio for our sample is 3.182 (median 1.753). These statistics reveal that our firms are generally larger than average with somewhat lower market-to-book ratios, which is consistent with the nature of firms with defined benefit pension plans.¹³ Overall, our descriptive data are comparable to those of earlier papers studying pension accounting (e.g., Barth 1991). Panel B of Table 2 provides descriptive statistics for measures used in our price association regressions, with most variables deflated by current-year sales revenue. The mean and median *PBO-X* (0.175 and

¹³ For comparison, the mean total assets, market capitalization, and market-to-book ratio for all firm-years in Compustat during the same sample period are \$2.8 billion, \$1.4 billion, and 6.56, respectively.

0.123) are identical to that of the PBO, suggesting that the average *PBO-D* is close to zero. Also, the standard deviation of the discretionary component (*PBO-D*) is more than an order of magnitude smaller than that of the nondiscretionary component (*PBO-X*), which suggests that much of the variation in PBO is attributable to industry-wide factors over which the manager has no discretion.

IV. RESULTS

Stock Price Association Tests

We assess the value relevance of the discretionary component of the PBO through price association regressions, where the market value of equity is regressed on contemporaneous accounting measures. We adopt a levels (price) rather than a changes (returns) specification because it is economically better specified (Kothari and Zimmerman 1995), consistent with prior pension research (Landsman 1986; Barth 1991; Barth et al. 1992) and appropriate for our research question, which examines the value relevance of a balance sheet item. However, the price specification suffers from econometric problems, especially heteroscedasticity (Kothari and Zimmerman 1995), and inferences from R^2 s can be problematic due to scale bias (Brown et al. 1999). To mitigate these problems, we report results from a sales-deflated version of our model.¹⁴

We examine both relative and incremental value relevance of the discretionary component of PBO. For the relative value-relevance tests, we compare the explanatory power (and coefficients) across two models where PBO is measured with and without discretion. For the incremental value-relevance tests, we include both the discretionary and nondiscretionary components of PBO in the same model and examine the sign and significance of the coefficient on the discretionary component.

We first examine the *relative* value relevance of the pension liability with discretion (i.e., *PBO*) and without discretion (i.e., *PBO-X*) by comparing the following two models (subscripts *i* and *t* represent firm and year):

$$P_{it} = a_0 + \sum_{t=1992}^{2003} a_t I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO_{it} + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it} \quad (7)$$

$$P_{it} = a_0 + \sum_{t=1992}^{2003} a_t I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO-X_{it} + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it} \quad (8)$$

where P_{it} is market capitalization at current fiscal year-end; I_t is a dummy variable for each year from 1992 through 2003; $NPTA_{it}$ and $NPTL_{it}$ are nonpension assets and liabilities; PA_{it} is fair value of pension assets; PBO_{it} is the projected benefit obligation disclosed in the pension footnote; and $PBO-X_{it}$ is the nondiscretionary portion of pension obligation (as defined in Section III). As noted earlier, all variables (with the exception of *SALEGRW* and *EMP*) are deflated by sales.

¹⁴ As a sensitivity check, we also estimate our models on undeflated and per-share basis and find qualitatively similar results.

In addition to the variables of interest, we include a vector of control variables: NI_{it} is income before extraordinary items; $SALEGRW_{it}$ is the average sales growth over the previous three years;¹⁵ $R\&D_{it}$ is research and development expense; and EMP_{it} is number of employees in thousands. We include NI_{it} because Ohlson (1995) shows that, when income is neither perfectly persistent nor transitory, the correct specification of the price association model is one that includes both the book value of equity and income. $SALEGRW_{it}$ is included to control for growth opportunities not reflected in the financial statements. Finally, we include EMP_{it} and $R\&D_{it}$ as control variables to mitigate the effects of the service cost anomaly.¹⁶ Although service cost is never featured as a separate explanatory variable in any of our models, it is embedded in our measures of the pension liability and thus may affect our inferences in the absence of these control variables. Generally, the coefficients on our control variables are in the predicted direction and statistically significant for most specifications.

Panel A of Table 3 reports the regression results of Models (7) (with discretion) and (8) (without discretion). The adjusted R^2 (56.8 percent) of Model (7) is the same as that of Model (8), and the coefficient weight on PBO_{it} (−0.601) is slightly larger than that on $PBO-X_{it}$ (−0.540), although the difference is not statistically significant. These results suggest that allowing discretion in PBO at least does not impair the value relevance of reported pension obligation.

Next, we perform *incremental* association tests using the following model:

$$P_{it} = a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO-X_{it} + b_5 PBO-D_{it} + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it} \quad (9)$$

where $PBO-D_{it}$ is the discretionary component of PBO and all other variables are as defined earlier. The results are reported in Panel B of Table 3. The pricing coefficient of $PBO-D_{it}$ is negative and significant ($p = 0.02$, two-tailed). The magnitude of the coefficient of $PBO-D_{it}$ (−1.068) is larger than that of $PBO-X_{it}$ (−0.600), although F-test for equality suggests the two coefficients are not statistically different at conventional levels of significance.¹⁷

In summary, our price association tests suggest that (1) discretion does not impair the relative value relevance of the PBO; and (2) the discretionary component of the pension liability is incrementally priced by the market in a manner similar to the nondiscretionary component. This suggests that discretionary choices made by managers in selecting pension assumptions provide valuable information to the market about the underlying economics of the pension obligation.

¹⁵ When sales growth data are unavailable for the three previous years, we use either two- or one-year average sales growth as a substitute to maximize the number of usable observations.

¹⁶ The service cost anomaly refers to the anomalous positive relation between service cost (an expense) and stock price, which was first reported by Barth et al. (1992). Subramanyam and Zhang (2001) argue that the positive relation between service cost and price occurs because service cost proxies for value created by human capital. They control for this effect by adding the number of employees and research and development expense in the regression and show that the coefficient on service cost becomes negative (which is theoretically correct) after inclusion of these control variables.

¹⁷ Inability to reject the null that the coefficients on $PBO-X$ and $PBO-D$ are equal is not equivalent to *accepting* the null of no difference between the coefficients. Following Chung and Kallapur (2003) and Greenwald (1975), we examine the confidence intervals of the coefficient differences to ascertain whether the null is likely to be true. The 95 percent confidence limits of the coefficient differences are −0.861 and 0.275, which are economically significant, suggesting that the null of equality in the coefficient estimates is unlikely to be true. Statistically, we cannot accept the null of equality of coefficients, although neither can we reject this null.

TABLE 3
Market Value Association Tests^{a,b}

Panel A: Relative Association Tests		$\frac{NPTA}{NPTL}$	$\frac{NPTL}{PA}$	$\frac{PBO-X}{PBO-X}$	$\frac{PBO-D}{PBO-D}$	$\frac{NI}{NI}$	$\frac{SALE}{GRW}$	$\frac{R\&D}{R\&D}$	$\frac{EMP}{EMP}$	$\frac{Adj. R^2}{Adj. R^2}$
Models:		$P_t = a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NPTA_t + b_2 NPTL_t + b_3 PA_t + b_4 PBO + c_1 NI_t + c_2 SALEGRW_t + c_3 R\&D_t + c_4 EMP_t + e_t$								
With Discretion		$P_t = a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NPTA_t + b_2 NPTL_t + b_3 PA_t + b_4 PBO-X + c_1 NI_t + c_2 SALEGRW_t + c_3 R\&D_t + c_4 EMP_t + e_t$								
		1.351 (0.00)	-1.333 (0.00)	0.501 (0.00)	-0.601 (0.00)	2.197 (0.00)	0.126 (0.00)	10.752 (0.00)	0.001 (0.00)	56.8%
Without Discretion		1.349 (0.00)	-1.332 (0.00)	0.448 (0.00)	-0.540 (0.00)	2.201 (0.00)	0.127 (0.00)	10.726 (0.00)	0.001 (0.00)	56.8%
Difference		0.002 (0.97)	-0.002 (0.97)	0.053 (0.71)	-0.061 (0.72)	-0.004 (0.99)	-0.001 (0.99)	0.026 (0.97)	0.000 (0.96)	0.0% (0.12)
Panel B: Incremental Association Tests										
Model:		$P_t = a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NPTA_t + b_2 NPTL_t + b_3 PA_t + b_4 PBO-X_t + b_5 PBO-D_t + c_1 NI_t + c_2 SALEGRW_t + c_3 R\&D_t + c_4 EMP_t + e_t$								
		1.351 (0.00)	-1.335 (0.00)	0.501 (0.00)	-0.600 (0.00)	-1.068 (0.02)	2.197 (0.00)	0.126 (0.00)	10.741 (0.00)	0.001 (0.00)
F-Test $b_4 = b_5$		(0.27)								

^a Our sample consists of 12,567 firm-years from 1991–2003. We delete 1 percent of observations with the smallest and the largest values of studentized residuals to remove the effect of outliers. The dependent variable in all regressions is market capitalization at current fiscal year-end. All variables except for SALEGRW and EMP are deflated by current-year sales.

^b I_t is a dummy variable for each year from 1992 through 2003; p-values for coefficient estimates and their differences are two-sided and White (1980) adjusted; p-values for R² differences are based on Vuong's (1989) test statistic.

All independent variables (NPTA, NPTL, PA, PBO, PBO-X, PBO-D, NI, SALEGRW, R&D, and EMP) are defined in Table 2.

Time-Series and Cross-Sectional Variation

While our results suggest that, on average, discretion improves the value relevance of the PBO, we do not imply that managers never engage in opportunistic management of PBO assumptions. Prior research has shown that managers' choice of pension assumptions are consistent with opportunistic incentives related to capital market considerations, debt contracting, and legal requirements (e.g., Feldstein and Morck 1983; Gopalakrishnan and Sugrue 1995; Godwin et al. 1996; Asthana 1999). We therefore emphasize that while *on average* pension assumption choices likely reflect economic characteristics of the pension plans, certain firms undoubtedly do manage assumptions opportunistically. Accordingly, in this section we examine whether the *PBO-D* varies with factors related to agency considerations and whether this causes a variation in its pricing coefficient. Since the funded status of the pension plan has most consistently been shown to be associated with pension assumption management (e.g., Asthana 1999), we examine time-series and cross-sectional variation in our results with respect to the funded status.

Time-Series Variation

Corporate pension plans in the U.S. were well funded in the 1990s, but have experienced a reversal of fortune since 2000 because of a significant drop in stock valuations and declining interest rates.¹⁸ In our sample, the mean (median) funded status, which was 5.0 percent (1.5 percent) of PBO during 1991–2000, declined to –16.3 percent (–19.1 percent) of PBO during 2001–2003 (results not tabulated). The deterioration in funded status suggests that there might be greater incentives to manipulate pension assumptions during 2001–2003, which could result in the stock market attaching relatively lower weight on the *PBO-D* during this period. Accordingly, we examine whether the pricing coefficient on *PBO-D* differs across these two periods by estimating the following regression:

$$\begin{aligned}
 P_{it} = & a_0 + \sum_{t=1992}^{2003} a_t I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO-X_{it} \\
 & + b_5 PBO-D_{it} + b_6 PBO-D_{it} * Post2000 + c_1 NI_{it} + c_2 SALEGRW_{it} \\
 & + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it}
 \end{aligned} \tag{10}$$

where *Post2000* is a dummy variable taking the value of 1 for years 2001–2003, and 0 for years 1991–2000. All other variables are previously defined.

Table 4, Panel A reports results of estimating Equation (10). The estimated pricing coefficient on *PBO-D* (which represents the pricing coefficient on *PBO-D* for the 1991–2000 period) is –0.907 and marginally significantly negative (at $p = 0.10$, two-tailed). The coefficient on *PBO-D * Post2000* (–0.293) is not significant at conventional levels. The sum of the coefficients on *PBO-D* and *PBO-D * Post2000* (which represents the pricing coefficient on *PBO-D* for the period 2001–2003) is –1.199 and marginally significantly negative (at $p = 0.10$, two-tailed). Overall, there is no evidence suggesting that the pricing coefficient on *PBO-D* was lower in magnitude during 2001–2003 than during 1991–2000.

Cross-Sectional Variation

We also examine cross-sectional variation in *PBO-D* and its pricing coefficient with respect to funded status. We define the extent of underfunding as nondiscretionary pension

¹⁸ For example, defined benefit plans in the S&P 500 companies were roughly \$300 billion overfunded in 1999 and became underfunded by \$340 billion in mid-2003 (Morgan Stanley 2003).

TABLE 4
Time-Series and Cross-Sectional Analyses^{a,b}

Panel A: Time-Series Variation

$$\text{Model: } P_{it} = a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO-X_{it} + b_5 PBO-D_{it} + b_6 PBO-D_{it} * Post2000 + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it}$$

<i>NPTA</i>	<i>NPTL</i>	<i>PA</i>	<i>PBO-X</i>	<i>PBO-D</i>	<i>PBO-D</i> <i>*Post2000</i>	<i>NI</i>	<i>SALE-GRW</i>	<i>R&D</i>	<i>EMP</i>	Adj. R ²	<i>b</i> ₅ + <i>b</i> ₆
1.351 (0.00)	-1.334 (0.00)	0.499 (0.00)	-0.599 (0.00)	-0.907 (0.10)	-0.293 (0.74)	2.202 (0.00)	0.126 (0.00)	10.730 (0.00)	0.001 (0.00)	56.8%	-1.199 (0.10)

Panel B: Cross-Sectional Variation

$$\text{Model: } P_{it} = a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO-X_{it} + b_5 PBO-D_{it} + b_6 PBO-D_{it} * UFUND + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + c_5 UFUND_{it} + e_{it}$$

<i>NPTA</i>	<i>NPTL</i>	<i>PA</i>	<i>PBO-X</i>	<i>PBO-D</i>	<i>PBO-D</i> <i>*UFUND</i>	<i>NI</i>	<i>SALE-GRW</i>	<i>R&D</i>	<i>EMP</i>	Adj. R ²	<i>b</i> ₅ + <i>b</i> ₆
1.352 (0.00)	-1.335 (0.00)	0.457 (0.00)	-0.554 (0.00)	-1.415 (0.06)	0.623 (0.49)	2.195 (0.00)	0.126 (0.00)	10.742 (0.00)	0.001 (0.00)	56.8%	-0.791 (0.15)

^a Our sample consists of 12,567 firm-years from 1991–2003. We delete 1 percent of observations with the smallest and the largest values of studentized residuals to remove the effect of outliers. The dependent variable in all regressions is market capitalization at current fiscal year-end. All variables except for *SALEGRW*, *EMP*, *Post2000*, and *UFUND* are deflated by current-year sales.

^b *I_t* is the dummy variable for each year from 1992 through 2003; p-values for coefficient estimates and their differences are two-sided and White (1980) adjusted; p-values for R² differences are based on Vuong's (1989) test statistic.

Variable Definitions:

Post2000 = indicator variable taking the value of 1 for years 2001–2003, and 0 otherwise; and

UFUND = indicator variable taking the value of 1 when the extent of underfunding is above the median and 0 otherwise, where the extent of underfunding is defined as nondiscretionary pension liability (*PBO-X*) minus the fair value of pension assets (*PA*), divided by reported pension liability (*PBO*).

All other independent variables (*NPTA*, *NPTL*, *PA*, *PBO-X*, *PBO-D*, *NI*, *SALEGRW*, *R&D*, and *EMP*) are defined in Table 2.

liability ($PBO-X$) minus the fair value of pension assets (PA), divided by reported pension liability (PBO). We find (not tabulated) that $PBO-D$ is negatively correlated with the extent of underfunding (Pearson/Spearman correlation of $-0.128/-0.137$), which is consistent with firms with underfunded plans reducing reported PBO numbers through assumptions choices. We next examine cross-sectional variation in the pricing coefficient on $PBO-D$ through the following equation:

$$\begin{aligned}
 P_{it} = & a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO-X_{it} \\
 & + b_5 PBO-D_{it} + b_6 PBO-D_{it} * UFUND + c_1 NI_{it} + c_2 SALEGRW_{it} \\
 & + c_3 R\&D_{it} + c_4 EMP_{it} + c_5 UFUND + e_{it}
 \end{aligned} \tag{11}$$

where $UFUND$ is an indicator variable that takes the value of 1 when the extent of underfunding is above the median, and 0 otherwise; and all other variables are previously defined.¹⁹

Results of estimating Equation (11) are reported in Panel B of Table 4. The pricing coefficient on $PBO-D$ (-1.415), which represents the coefficient for the *least* underfunded firms, is significantly negative ($p = 0.06$, two-tailed). The coefficient on $PBO-D * UFUND$ (0.623) is positive, but insignificant ($p = 0.49$, two-tailed). The sum of the coefficients on $PBO-D$ and $PBO-D * UFUND$ (-0.791), which represents the coefficient for the *most* underfunded firms, is negative and insignificant ($p = 0.15$, two-tailed). Although the relative magnitudes for the coefficients on the least and most unfunded plans are in the predicted direction, the difference is not statistically significant.

V. ALTERNATIVE EXPLANATIONS

In the previous section, we show that the stock market prices the discretionary component of the PBO in a similar manner to the nondiscretionary component. One interpretation of this result is that value-relevant information is communicated through the discretionary component. However, there are two potential alternative explanations: (1) measurement error in the decomposition of the PBO into discretionary and nondiscretionary components makes their pricing coefficients arise mechanically; and (2) the stock market fixates on reported PBO numbers without considering the differential value relevance of the discretionary and nondiscretionary components. In this section, we address each of these alternative explanations in order.

Measurement Error

Guay et al. (1996) show that similar pricing coefficients on the discretionary and non-discretionary accruals' components is consistent with significant measurement error such as that arising from a random decomposition of accruals. Our pricing results are consistent with a random decomposition of the PBO, suggesting measurement error in our discretionary component is a plausible alternative explanation. Because we functionally derive the discretionary component ($PBO-D$), we argue that the $PBO-D$ is less susceptible to measurement error than earlier methods such as the Jones (1991) model, especially to error arising from incomplete model specification (see Section II). However, we do not claim that the $PBO-D$ is free of measurement problems. Measurement problems can arise under

¹⁹ We also examine rank specifications where we partition the sample into four, five, and ten portfolios based on the extent of underfunding and find qualitatively similar results.

our methodology for at least two reasons. First, *PBO-D* could estimate the effects of deviations in pension assumptions from their benchmarks with error, i.e., there could be error in our functional derivation of *PBO-D*. Second, inappropriate choice of benchmarks could affect what we define as discretionary and, thus, spuriously lead us to conclude that the discretionary component is priced. In the following two subsections we explore separately each of these two measurement problems and report results of diagnostic tests and sensitivity analyses that we perform to rule out the measurement error explanation for our results.

Does PBO-D Accurately Reflect Deviations in Pension Assumptions?

In this subsection, we evaluate the representational faithfulness of *PBO-D* in measuring the effects on the *PBO* of deviations in the reported pension assumptions (r and g) from their respective researcher-imposed benchmarks (r^* and g^*). We discuss the appropriateness of the benchmarks in the next subsection.

Measurement error could arise from our functional derivation of *PBO-D* if there is error in estimating the functional parameters, such as post-retirement life expectancy (L) or remaining service life (N). For example, we assume employee post-retirement life expectancy (L) is 15 years for all firms. To the extent that there is cross-sectional variation in this measure, our discretionary component is measured with error. In particular, our assumption of $L = 15$ may overstate life expectancy for firms that have a large proportion of retirees in the pension plans. Measurement error can also arise in our estimate of N . Since N measures the average remaining service life, it measures the average years to retirement with error, particularly for plans with large proportion of retirees or high employee turnover.

Before we test the extent of measurement error in *PBO-D*, we first examine the materiality of measurement error in L and N on the measurement of the *PBO-D*. To do this, we estimate two alternative measures of *PBO-D* by respectively substituting our current assumptions (or estimates) for L and N in Equation (5) with randomized values selected from uniform distributions respectively over the range of (5,20) and (0,50).²⁰ We then examine how our original *PBO-D* measure correlates with these two alternative measures of *PBO-D*. Panel A of Table 5 reports these correlations. We find that randomizing L has a negligible effect on the computation of *PBO-D* (both Pearson and Spearman correlations between the original *PBO-D* measure and that using randomized L are approximately 0.99). While randomizing N has a larger effect on the *PBO-D* computation than L (Pearson/Spearman correlation is 0.73/0.84), its effect is also not economically significant. In contrast, when we estimate *PBO-D* by randomly decomposing *PBO* a la Guay et al. (1996), its correlation with our original *PBO-D* measure is close to zero. These preliminary diagnostics suggest that estimation error in parameters determining *PBO*—such as L and N —are unlikely to have material effects on the computation of *PBO-D*.

We next perform two tests to directly evaluate the representational faithfulness of our *PBO-D* measure in capturing the effects of deviations in pension assumptions from their industry benchmarks. First, we examine the extent of variation in *PBO-D* that is explained by the two discretionary choices being manipulated, namely the discount rate (r) and compensation growth rate (g). Specifically, we estimate the following regression:

²⁰ We use alternative ranges for the distributions and find qualitatively similar results.

TABLE 5
Tests of Measurement Error

Panel A: Correlation between Our Original and Various Randomly Generated Measures of *PBO-D*^a

Correlation	Randomized <i>L</i>	Randomized <i>N</i>	Random Decomposition
Pearson	0.989 (0.00)	0.733 (0.00)	0.007 (0.48)
Spearman	0.992 (0.00)	0.843 (0.00)	0.007 (0.45)

Panel B: Regressing Various Measures of *PBO-D* on Deviations of *r* and *g* from Their Respective Industry Benchmarks^a

Model: $\frac{PBO-D}{PBO}_t = a + b_1(r_t - r_t^*) + b_2(g_t - g_t^*) + e_t$

<i>PBO-D</i> Measures	Intercept	$r_t - r_t^*$	$g_t - g_t^*$	Adj. <i>R</i> ²
Our Measure	-0.001 (0.00)	-9.853 (0.00)	3.698 (0.00)	91.6%
Randomized <i>L</i>	0.000 (0.02)	-8.934 (0.00)	3.747 (0.00)	88.1%
Randomized <i>N</i>	-0.025 (0.00)	-27.433 (0.00)	23.559 (0.00)	77.4%
Random Decomposition	-0.001 (0.26)	-0.008 (0.94)	-0.055 (0.49)	-0.0%

(continued on next page)

TABLE 5 (Continued)

Panel C: Regression of Actuarial Gain/Loss on Changes in *PBO* Due to Changes in *r* and *g*^b

Model: $\frac{ACTGL_{it}}{PBO_{it}} = a + b \frac{PBO-Z_{it}^{-1}}{PBO_{it}} + e_{it}$

Alternative	Full Sample				Firm-Years with <i>g</i> Unchanged			
	$\frac{PBO-Z_{it}^{-1}}{PBO_{it}}$		Adj. R ²		$\frac{PBO-Z_{it}^{-1}}{PBO_{it}}$		Adj. R ²	
Measures of <i>PBO-D</i>	Intercept				Intercept			
Our Measure	0.013 (0.00)	1.121 (0.00)	53.0%		0.010 (0.00)	1.182 (0.00)	64.5%	
Randomized <i>L</i>	0.014 (0.00)	1.180 (0.00)	50.9%		0.011 (0.00)	1.241 (0.00)	62.6%	
Randomized <i>N</i>	0.024 (0.00)	0.250 (0.00)	33.8%		0.020 (0.00)	0.309 (0.00)	52.3%	
Random Decomposition	0.022 (0.00)	-0.064 (0.71)	-0.0%		0.021 (0.00)	-0.305 (0.31)	0.0%	

Panel D: Market Value Incremental Association Tests with *PBO-X* and *PBO-D* Calculated Using Alternative Benchmarks for *r* and *g*^a

Model: $P_{it} = a_0 + \sum_{t=1992}^{2003} a_1 I_t + b_1 NP_{TA_{it}} + b_2 NP_{TL_{it}} + b_3 PA_{it} + b_4 PBO-X_{it} + b_5 PBO-D_{it} + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it}$

Alternative Benchmarks	$\frac{NP_{TA}}{NP_{TL}}$		$\frac{PA}{PBO-X}$		$\frac{PBO-D}{PBO-X}$		$\frac{NI}{R\&D}$		$\frac{EMP}{R\&D}$		Adj. R ²	
	Industry Median <i>r</i> * and <i>g</i> *		F-Test <i>b</i> ₄ = <i>b</i> ₅		Random <i>r</i> * and <i>g</i> *		F-Test <i>b</i> ₄ = <i>b</i> ₅					
Industry Median <i>r</i> * and <i>g</i> *	1.352 (0.00)	-1.335 (0.00)	0.501 (0.00)	-0.600 (0.00)	-1.068 (0.02) (0.27)	2.197 (0.00)	10.741 (0.00)	0.001 (0.00)	56.8%			
Random <i>r</i> * and <i>g</i> *	1.351 (0.00)	-1.334 (0.00)	0.505 (0.00)	-0.602 (0.00)	-0.509 (0.00) (0.41)	2.199 (0.00)	10.745 (0.00)	0.001 (0.00)	56.8%			

(continued on next page)

TABLE 5 (Continued)

AA-Rate for r^* , Industry Median for g^* F-Test $b_4 = b_5$	1.353 (0.00)	-1.336 (0.00)	0.502 (0.00)	-0.596 (0.00)	-1.197 (0.01) (0.15)	2.197 (0.00)	0.126 (0.00)	10.747 (0.00)	0.001 (0.00)	56.8%
AA-Rate for r^* , Population Median for g^* F-Test $b_4 = b_5$	1.350 (0.00)	-1.333 (0.00)	0.498 (0.00)	-0.598 (0.00)	-0.520 (0.25) (0.85)	2.198 (0.00)	0.126 (0.00)	10.723 (0.00)	0.001 (0.00)	56.8%

* Our sample consists of 12,567 firm-years from 1991–2003. We delete 1 percent of observations with the smallest and the largest values of studentized residuals to remove the effect of outliers.

^b Initial sample consists of 12,567 firm-years from 1991–2003; data limitation on actuarial gain/loss reduces the final sample size to the following: “full sample” consists of 8,590 firm-observations, and “firm-years with g unchanged” consists of 3,777 firm-observations. We delete 1 percent of observations with the smallest and the largest values of studentized residuals to remove the effect of outliers.

Panel A reports the correlation between our original measure of $PBO-D$ and various alternative measures of $PBO-D$. $PBO-D$ is the discretionary component of projected benefit obligation. Our measure of $PBO-D$ is estimated from our original model described in Section III, using industry-medians of discount rate and compensation growth rate and assuming an employee post-retirement life expectancy (L) of 15 years. $PBO-D$ with “randomized L ” is estimated using the original model with L randomly drawn from a uniform distribution over [5,20] years. $PBO-D$ with “randomized N ” is estimated using the original model with N randomly drawn from a uniform distribution over [0,50] years. We construct the “Random decomposition” measure of $PBO-D$ a la Guay et al. (1996) by randomly decomposing PBO into a discretionary component and a nondiscretionary component as follows: we first obtain measure of (undeflated) randomized nondiscretionary PBO which is equal to $PBO \cdot e$, where e is randomly drawn from a uniform distribution over [0.88,1.12]. The range of distribution is chosen based on the standard deviation of undeflated PBO and $PBO-D$. The randomized measure of $PBO-D$ is then measured as the difference between PBO and $RPBO-X$, deflated by PBO .

Panel B reports results from regressing various measures of $PBO-D$ on deviations of r and g from their respective benchmarks. Measures of $PBO-D$ are as defined in Panel A. r and g are assumed discount rate and compensation growth rate, respectively. r^* and g^* are industry medians of r and g , respectively. p -values for coefficient estimates are two-sided.

Panel C reports results from regression of actuarial gain/loss on changes in PBO due to changes in r and g . $ACTGL_n$ is estimated as the difference between fair-value pension expense and the sum of service cost, interest cost, and actual return on plan assets. Fair-value pension expense is measured as the difference between employer contributions and changes in the funded status. $PBO-Z_{t-1}$ is the difference between PBO_t and $PBO-X_{t-1}$, and $PBO-X_{t-1}$ is the estimate of PBO_t using year $t-1$ assumptions for r and g . Alternative measures of PBO_t and $PBO-X_{t-1}$ are used: “our measure” is constructed based on the assumptions employed in our original model; “randomized L ” assumes an L that is randomly drawn from a uniform distribution over [5,20] years; “randomized N ” assumes an N that is randomly drawn from a uniform distribution over [0,50] years; “random decomposition” corresponds to a randomized $PBO-Z_{t-1}$ that randomly deviates from PBO by 1 percent. The 1 percent deviation is chosen such that the variability in the randomized $PBO-Z_{t-1}$ (deflated by PBO) is comparable to that of our original measure. p -values for coefficient estimates are two-sided.

Panel D reports results from market value incremental association tests using alternative measures of $PBO-X$ and $PBO-D$. The dependent variable is market capitalization at current fiscal year-end. All variables except for $SALEGRW$ and EMP are deflated by current-year sales. I_t is the dummy variable for each year from 1992 through 2003. Independent variables $NPTA$, $NPTL$, PA , $PBO-X$, $PBO-D$, NI , $SALEGRW$, $R\&D$, and EMP are defined in Table 2. Various benchmarks are used to calculate $PBO-X$ and $PBO-D$: “Industry median” means that $PBO-X$ and $PBO-D$ are our original measures as described in Panel A. $PBO-X$ and $PBO-D$ with “randomized r^* and g^* ” are estimated using a randomized r^* and g^* , where r^* is randomly drawn from a uniform distribution over [2%,13%] and g^* is randomly drawn from a uniform distribution over [1%,15%]. $PBO-X$ and $PBO-D$ with “population median” are estimated using the annual population medians of r and g . $PBO-X$ and $PBO-D$ with “AA-rate for r ” are estimated using the AA corporate bond yield. p -values for coefficient estimates and their differences are two-sided and White (1980) adjusted.

$$\frac{PBO-D_{it}}{PBO_{it}} = a_1 + b_1(r_{it} - r_{it}^*) + b_2(g_{it} - g_{it}^*) + e_{it} \quad (12)$$

where all variables are as defined previously. The dependent variable measures the proportion of the PBO that we partition as discretionary, and the explanatory variables are the two discretionary assumption choices we study, i.e., the deviation of reported discount rate and compensation growth rate from their respective industry medians. If there is considerable measurement error in *PBO-D*, then we should observe that the discretionary assumption choices do not explain much of the variation in the dependent variable. In particular, a random decomposition of *PBO* would result in an R^2 of close to zero. On the other hand, if the explanatory power of the regression modeled in Equation (12) is high, then it is unlikely that our measure of *PBO-D* has substantial measurement error.

Panel B of Table 5 shows that coefficients on both explanatory variables are significant in the predicted direction (at $p \leq 0.01$, two-tailed). More importantly, the adjusted R^2 of the regression is 91.6 percent. This suggests that a substantial portion of the variation in *PBO-D* is explained by the two discretionary assumption choices we study. Additionally we note that the explanatory power of the above regression is understated because we fit a linear specification to an essentially nonlinear relation.²¹

We also estimate Equation (12) with *PBO-D* measured with randomized *L* and *N*. As expected, the R^2 s from regressions using the randomized benchmarks (88.1 percent for randomized *L* and 77.4 percent for randomized *N*) are lower than that using our original measure. Further, when we generate *PBO-D* by randomly decomposing *PBO* a la Guay et al. (1996), the R^2 is close to zero. These sensitivity results establish the validity of our diagnostic test and suggest that our estimate of *PBO-D* is not significantly affected by measurement error.

As an additional diagnostic test, we apply our estimation methods in an alternative setting where we are able to compare our estimates with certain footnote disclosures. Specifically, SFAS No. 87 requires that companies report *actuarial gain/loss*, which are actuarial estimates of changes to PBO during the year arising from changes in pension assumptions—primarily, but not limited to, discount rate and compensation growth rate. We estimate changes in PBO arising from movements in discount rate and compensation growth rate during the year, *using our estimation methods*, and then compare these estimates with

²¹ There are two issues with respect to Equation (12) that require clarification. First, we demonstrate that Equation (12) is not a tautology, i.e., even after assuming linearity we do not necessarily get a 100 percent R^2 for the regression specified in Equation (12). Hypothetically, one can generate a measure of *PBO-D* that is an arbitrary function of $(r - r^*)$ and $(g - g^*)$ and produces a perfect fit for Equation (12). For example, $PBO-D = [(r - r^*) + (g - g^*)] * PBO$ will generate an R^2 of 100 percent. However, it is important to note that we estimate *PBO-D* as the difference between *PBO* and *PBO-X*, where *PBO-X* is modeled as a function of r^* and g^* , rather than estimate *PBO-D* directly as some function of $r - r^*$ and $g - g^*$. That is, we estimate $PBO-D = PBO - PBO-X = f_0(r, g) - f_1(r^*, g^*)$, rather than $PBO-D = f_2(r - r^*, g - g^*)$. Because of this, the regression specified in Equation (12) will produce a 100 percent R^2 (assuming linearity) *only* if our estimation procedure (f_1) accurately reflects the actual functional relation between PBO and r/g that is embedded in the reported PBO (f_0), i.e., $f_1 \rightarrow f_0$. On the contrary, if we had directly estimated *PBO-D* as a function of $r - r^*$ and $g - g^*$, then our tests would have been tautological and produced an R^2 of 100 percent (assuming linearity). In other words, since we measure *PBO-D* as the difference between reported PBO and our estimate of *PBO-X*, we will get a good fit for the regression specified in Equation (12) only if we accurately model the relation between PBO and r/g that is implicit in the reported PBO. Second, we need to carefully consider the effect of deflating *PBO-D* by PBO in Equation (12). Because of such deflation, the dependent variable in Equation (12) is equivalent to $PBO-D/PBO = [f_0(r, g) - f_1(r^*, g^*)]/f_0(r, g) = 1 - f_1(r^*, g^*)/f_0(r, g)$. Therefore, the correct specification of Equation (12) should be one where the explanatory variables are in ratio form. As a sensitivity test, we estimate Equation (12) with the independent variables specified in ratio form and find qualitatively similar results.

the actuarial gain/loss reported by the company. Specifically, we estimate the following regression:

$$\frac{ACTGL_{it}}{PBO_{it}} = a + b \frac{PBO - Z_{it}^{-1}}{PBO_{it}} + e_{it} \quad (13)$$

where $ACTGL_{it}$ is reported actuarial gain/loss, $PBO - Z_{it}^{-1}$ is PBO_{it} minus $PBO - X_{it}^{-1}$, and $PBO - X_{it}^{-1}$ is the estimate of PBO_{it} (based on our estimation methods) using year $t-1$ assumptions for r and g . In other words, $PBO - Z_{it}^{-1}$ measures the change in PBO that our method estimates would have occurred in year t given the actual changes in interest rate and compensation growth rate assumptions. Therefore, by comparing our calibrated values ($PBO - Z_{it}^{-1}$) with the reported actuarial gain/loss ($ACTGL_{it}$), we can assess the extent to which our estimation methods accurately capture the effects of r and g on PBO .

Before we report the results of this exercise, it is important to highlight certain caveats regarding the measurement of $ACTGL_{it}$. First, because of data limitations in Compustat we are able to only indirectly estimate $ACTGL_{it}$, such that it includes plan amendments and prior service cost effects in addition to actuarial gain/loss. While prior service cost and plan amendments arise less often than actuarial gain/loss, their effects on the PBO can be substantial during the years that they arise. Therefore, the inability to separate these effects can induce measurement error in $ACTGL_{it}$. Second, actuarial gain/loss can arise for reasons other than changes in r or g . These include changes in other assumptions such as employee turnover rates and life expectancy as well as adjustments based on actual experience. Therefore, even if we are able to measure actuarial gain/loss accurately (i.e., without inclusion of plan amendments and prior service cost), $ACTGL_{it}$ can still have considerable measurement error in terms of measuring the effects of r and g on the PBO .²²

Because of measurement error with the dependent variable ($ACTGL_{it}$), we caution that R^2 from estimating Equation (13) may be biased downward. However, since measurement error in the dependent variables does not bias the coefficient, we emphasize the estimated coefficient on $PBO - Z_{it}^{-1}$. Since the coefficient should be equal to 1 in the absence of measurement error, we can evaluate the economic significance of the measurement error by examining how the estimated coefficient values deviate from 1. Further, we also separately estimate Equation (13) for the subsample without change in g because prior service cost and plan amendments, which cause measurement error in $ACTGL_{it}$, are more likely to be nonzero when there is change in g .

Results of estimating Equation (13) are reported in Panel C of Table 5. For the full sample, the estimated coefficient on $PBO - Z_{it}^{-1}$ (using our original estimation methods) is 1.121 (significant at $p \leq 0.01$, two-tailed). Also, the adjusted R^2 is 53.0 percent, which is surprisingly high given the measurement problems with $ACTGL_{it}$. When we exclude firm-years with change in g , the regression coefficient on $PBO - Z_{it}^{-1}$ is 1.182 (significant at $p \leq 0.01$, two-tailed) and consistent with our conjecture, the adjusted R^2 is higher (64.5

²² The second measurement problem with $ACTGL$ is well illustrated by examining Alaska Air Group's 2001 pension footnote, which separately reports the following two components of $ACTGL$: (1) gain/loss from changes in pension assumptions: \$16.4 million; and (2) other actuarial loss: \$6.2 million. The first component likely reflects gain/loss from changes in r and g , and the second component can include both gain/loss from changes in other pension assumptions or gain/loss resulting from deviations from actual experience, which in this case, is a substantial portion of the total actuarial gain/loss. Since most companies, unlike Alaska Air Group, do not separately report these two components in their footnotes, it is difficult to determine the amount of gain/loss arising only from changes in r and g .

percent). These results suggest that every dollar of change in *PBO* that we estimate using our method is on average associated with \$1.12 to \$1.18 of actuarial gain/loss, which is consistent with high representational faithfulness of our *PBO-D* measure.

We next estimate Equation (13) where $PBO-Z_{it}^{-1}$ is generated with randomized L and N . As expected, randomizing L has negligible effect on our results since L does not have a material effect on *PBO-D*. When we randomize N , the ability of $PBO-Z_{it}^{-1}$ to explain changes in $ACTGL_{it}$ diminishes substantially—the coefficients drop to around a quarter of that using our original estimation methods. Given that randomizing N does not have a substantial effect on the measurement of *PBO-D*, these results illustrate the power of our diagnostic test. Finally, when we use a measure of $PBO-Z_{it}^{-1}$ that is consistent with the Guay et al. (1996) random decomposition, both the R^2 s and coefficients are indistinguishable from zero.

In conclusion, these diagnostic tests suggest that our estimate of *PBO-D* captures the effects of deviations in pension assumptions from industry medians in a sufficiently reliable manner. In particular, it is unlikely that our partitioning of *PBO* into discretionary and nondiscretionary components is similar to that of a random decomposition in the spirit of Guay et al. (1996).

Appropriateness of Industry Benchmarks

Our tests in the previous subsection establish the representational faithfulness of our estimated *PBO-D*, i.e., that our functional derivation of *PBO-D* accurately captures the deviation in pension assumptions. However, it must be noted that these diagnostics are merely tests of internal validity, i.e., they tell us how well the experimental manipulation of conditions (i.e., pension assumptions) are reflected in the experimental output—the discretionary component (*PBO-D*). They do not evaluate external validity, i.e., they do not tell us whether the experimental manipulation of the conditions (i.e., *our* choice of pension assumption benchmarks) is itself valid. In other words, our diagnostic tests do not examine the appropriateness of using industry medians as benchmarks.

Choice of appropriate benchmarks is crucial for drawing correct inferences. Inappropriate benchmarks will result in incorrect specification of the discretionary and nondiscretionary components, which could lead us to spuriously conclude that the discretionary component (i.e., *PBO-D*) is priced by the market. For example, if we naïvely assume that the benchmarks for r and g (i.e., r^* and g^*) are equal to zero, then all variation in the *PBO* will be classified as discretionary and obviously *PBO-D* will be priced by the market. To illustrate this point further, we estimate *PBO-D* using randomly generated benchmarks for r and g . Table 5, Panel D reveals that the coefficients on *PBO-X* and *PBO-D* using random r^* and g^* are qualitatively similar to those using industry medians in our incremental price association tests.²³ These results do not imply that our original pricing results using industry medians are spurious. Rather, these results merely suggest that use of random benchmarks causes economically relevant information in the firm's assumptions to be randomly embedded in both *PBO-X* and *PBO-D*.

In sum, it is difficult to formulate effective empirical tests for determining the appropriateness of the industry benchmarks. However, our results are unlikely spurious if the benchmarks are appropriately chosen. Appropriateness is largely determined by judging

²³ Unreported results show that the Pearson (Spearman) correlation between *PBO-D* using industry median benchmarks (our measure) and that using randomized r^* and g^* are 0.349 (0.193), suggesting that randomizing r^* and g^* has a material effect on the measurement of *PBO-D*. Thus, the similarity in pricing results is not due to lack of material differences in the estimation of *PBO-D*.

whether the choice of the benchmark has economic rationale, is descriptively valid and whether it is interesting that deviations from the benchmark are priced. Our choice of industry medians for benchmarks is consistent with institutional evidence. For example, analysts benchmark on industry averages when performing financial statement analysis and accounting standards specify uniform benchmarks within industries (e.g., AICPA issues SOPs that are largely industry-specific). For these reasons, it is interesting that deviations from industry benchmarks are priced by the market.

One drawback with using industry benchmarks is that it does not capture earnings management that occurs on average in the entire industry. Accordingly, in sensitivity tests we measure *PBO-D* using alternative benchmarks for r and g and report the results in Table 5, Panel D. Specifically, we measure *PBO-D* using AA corporate bond rates as the benchmark for r and alternatively use industry medians and population median as the benchmarks for g . We find qualitatively similar results to that using our original measure of *PBO-D*.²⁴

In conclusion, we can reliably state that the PBO component attributable to deviation in pension assumptions from industry medians is priced by the stock market. Whether deviations from industry benchmarks can be construed as discretionary depends on the particular form of uniform accounting that is proposed. We acknowledge that one can visualize a complex uniform accounting regime that incorporates more idiosyncratic economic information than merely industry averages, and it is possible that deviations from these richer benchmarks are not informative. However, as discussed earlier, such a system is difficult to implement and will practically suffer from the moral hazard problems that characterize a flexible accounting system such as the U.S. GAAP.

Functional Fixation

It is possible that the stock market fixates on reported PBO numbers without properly distinguishing the differential (if any) value relevance of the discretionary and nondiscretionary components. If this were the case, then our pricing results may be attributable to market mispricing rather than the value relevance of the discretionary component. *A priori*, it is unlikely that our results are attributable to market inefficiency. For example, Aboody et al. (2002) examine the implications of market inefficiency for value relevance studies and conclude that the economic significance of any bias that may arise from market mispricing for a price (i.e., levels) specification, such as ours, is unlikely to be material. Nevertheless, in this section, we explore the market mispricing explanation for our results.

Returns to Discretionary PBO Portfolios

We first examine whether there is significant market mispricing associated with the discretionary component of PBO (i.e., *PBO-D*). For this purpose, we design trading strategies based on the sign and magnitude of *PBO-D*. If *PBO-D* is value-irrelevant but the stock market attaches significant weight to it, then a trading strategy of buying firms with positive (or high) *PBO-D* and shorting firms with negative (or low) *PBO-D* should yield significant positive abnormal returns (note that positive *PBO-D* implies a liability). We examine returns to such a trading strategy by computing portfolio returns beginning three months after the end of the fiscal year and extending for durations of one and three years, where the portfolios are formed on the sign and magnitude of *PBO-D* at the end of the

²⁴ When we use population median for g , the *PBO-D* coefficient is not significantly negative (p -value = 0.25). While we use two-sided tests for testing significance of the *PBO-D* coefficient (largely to maintain consistency across all our tests), a one-sided test is more appropriate since we cannot hypothesize a positive coefficient on *PBO-D* under any circumstance. The above coefficient is marginally significant using a one-sided test.

fiscal year. We compute cumulative abnormal returns (*CAR*) as $\sum_{t=t0}^T R_t^i - \sum_{t=t0}^T ER_t^i$, where R_t^i is monthly cum-dividend return for stock i , ER_t^i is the corresponding expected return for that stock, and $t0$ and T represent the first and last months in our respective accumulation windows ($T = 12$ and 36). We compute two sets of *CARs* based on CAPM and the three-factor Fama and French (FF) model.²⁵

Panel A of Table 6 summarizes the results of the *PBO-D* portfolio strategies. We group our sample firms into quintile portfolios, both by year and for the pooled sample, based on *PBO-D* deflated by sales. Because the results are qualitatively similar across the two panels, we focus our discussion on the by-year portfolio results. The trading strategy that goes long (short) in firms with $PBO-D \geq 0$ ($PBO-D < 0$) yields insignificant one-year and three-year *CARs* for both abnormal returns benchmarks (i.e., CAPM and FF). Similarly, we do not find any positive and significant abnormal returns for the trading strategy that goes long (short) in firms with the highest (lowest) *PBO-D* portfolio (i.e., Portfolio 5 – Portfolio 1). Overall, our results suggest that there is unlikely significant mispricing associated with the discretionary component of the *PBO*.

Ex Post Intrinsic Value Association Tests

In this subsection, we adopt an alternative approach that is in the spirit of the remedy proposed by Aboody et al. (2002) to overcome market inefficiency-related bias in value relevance studies. Specifically, we replicate our pricing results after replacing stock price with a measure of *ex post* intrinsic value (IV_{it}):

$$IV_{it} = \sum_{\tau=1}^3 \frac{d_{t+\tau}}{(1+r)^\tau} + \frac{P_{t+3}}{(1+r)^3} \quad (14)$$

where $d_{t+\tau}$ is dividend realization for year $t+\tau$; r is the discount rate, which we set to a constant 10 percent; and P_{t+3} is stock price at the end of year $t+3$. Conceptually, *ex post* intrinsic value is the present value of *ex post* future dividends. Practically, we use a three-year horizon for dividends and use market price at the end of the third year as terminal value. To the extent that mispricing of current accounting information is reversed within three years, the use of our *ex post* intrinsic value measure in place of current stock price will ameliorate any bias arising from market inefficiency.²⁶

We replicate our price association tests by replacing current price with our measure of *ex post* intrinsic value. Table 6, Panel B reports results from the relative association tests. Similar to our price regressions, the adjusted R^2 of the regression with *PBO* (i.e., with discretion) is not significantly different from that of the regression with *PBO-X* (i.e., without

²⁵ Under CAPM: $ER_t^i = RF_t + b_i^j(MktRF_t)$ where RF_t = one-month T-bill return; $MktRF_t$ = excess return on a value-weighted aggregate market proxy. We estimate b_i^j during a hold-out period $[t-36, t-1]$ by regressing monthly stock excess return on the market excess return for each stock: $R_t^i - RF_t = a_i + b_i^j(MktRF_t) + e_{it}$.

Under the three-factor Fama and French model: $ER_t^i = RF_t + b_i^j(MktRF_t) + s_i^s(SMB_t) + h_i^b(HML_t)$, where SMB_t = returns on factor-mimicking portfolio for size; HML_t = returns on factor-mimicking portfolio for book-to-market equity. We estimate b_i^j , s_i^s , h_i^b during a hold-out period $[t-36, t-1]$ by regressing monthly stock excess return on the market excess return and two factor-mimicking portfolio returns for each stock: $R_t^i - RF_t = a_i + b_i^j(MktRF_t) + s_i^s(SMB_t) + h_i^b(HML_t) + e_{it}$. We require that at least six observations are available for each regression estimation. In cases where less than six observations are available, we discard the factor loadings for month t and set three-factor abnormal return to missing for the period that includes month t .

²⁶ Since *ex post* intrinsic value is derived from future realizations of dividends and price, it contains information that is not yet available in year t . However, Aboody et al. (2002) argue that while unanticipated future information causes measurement error in the intrinsic value proxy, it is unlikely to cause bias in the coefficients.

TABLE 6
Additional Analysis on Future Returns and *ex post* Intrinsic Value

Panel A: Returns to Discretionary PBO Portfolios

Portfolio	Sorted by PBO-D: By Year				Sorted by PBO-D: Pooled Sample			
	1-Year Returns		3-Year Returns		1-Year Returns		3-Year Returns	
	PBO-D	CAPM	FF	FF	PBO-D	CAPM	FF	FF
1	-0.012	0.017	0.016	0.001	-0.012	0.026	0.014	0.002
2	-0.003	0.001	-0.008	-0.036	-0.003	-0.004	-0.010	-0.043
3	0.000	-0.030	-0.020	-0.103	0.000	-0.032	-0.014	-0.078
4	0.002	-0.015	-0.008	-0.035	0.002	-0.020	-0.013	-0.043
5	0.012	-0.004	-0.014	0.000	0.012	-0.002	-0.011	-0.021
Portfolio 5 minus 1 (p-values)		-0.021 (0.14)	-0.030 (0.04)	-0.011 (0.65)		-0.029 (0.04)	-0.025 (0.08)	-0.023 (0.35)
Long PBO-D ≥ 0 and Short PBO-D < 0 (p-values)		-0.013 (0.15)	-0.010 (0.27)	0.006 (0.73)				

Panel B: Intrinsic Value—Relative Association Tests

Models:	$IV_t = a_0 + \sum_{i=1992}^{2000} a_i I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it}$				$IV_t = a_0 + \sum_{i=1992}^{2000} a_i I_t + b_1 NPTA_{it} + b_2 NPTL_{it} + b_3 PA_{it} + b_4 PBO - X + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it}$			
	NPTA	NPTL	PA	PBO/ PBO-X	NI	SALE GRW	R&D	EMP
With Discretion	1.309 (0.00)	-1.234 (0.00)	0.584 (0.00)	-1.131 (0.00)	2.944 (0.00)	-0.040 (0.21)	17.276 (0.00)	0.001 (0.00)
Without Discretion	1.306 (0.00)	-1.231 (0.00)	0.495 (0.00)	-1.024 (0.00)	2.951 (0.00)	-0.039 (0.22)	17.222 (0.00)	0.001 (0.00)
Difference	0.003 (0.97)	-0.003 (0.97)	0.090 (0.71)	-0.107 (0.73)	-0.007 (0.99)	0.000 (0.99)	0.054 (0.99)	0.000 (0.94)

(continued on next page)

TABLE 6 (Continued)

Panel C: Intrinsic Value—Incremental Association Tests

Model:	$IV_{it} = a_0 + \sum_{i=1992}^{2000} a_i I_i + b_1 NPTA_{it} + b_2 NPRTL_{it} + b_3 PA_{it} + b_4 PBO-X_{it} + b_5 PBO-D_{it} + c_1 NI_{it} + c_2 SALEGRW_{it} + c_3 R\&D_{it} + c_4 EMP_{it} + e_{it}$									
F-Test $b_4 = b_5$	1.310 (0.00)	-1.235 (0.00)	0.563 (0.00)	-1.111 (0.00)	-1.778 (0.06) (0.44)	2.945 (0.00)	-0.040 (0.21)	17.218 (0.00)	0.001 (0.00)	46.2% (0.00)

Panel A: This table reports future excess returns over a one-year and a three-year window to a strategy based on *PBO-D*, the discretionary component of the projected benefit obligation. The initial sample is drawn from all Compustat firms with non-missing pension and share price data from 1991 through 2000. We further restrict the initial sample to firms with three-year-ahead monthly returns available in CRSP. Due to other data requirement described below, the final sample has 5,858 firm-year observations. Portfolios are formed by sorting *PBO-D* (deflated by sales) into quintiles. The column labeled *PBO-D* reports the mean of *PBO-D* deflated by sales for each portfolio. The panel labeled "Sorted by *PBO-D*: Pooled Sample" reports abnormal returns on portfolios formed by sorting the pooled sample into *PBO-D* quintiles. The panel labeled "Sorted by *PBO-D*: By Year" reports abnormal returns on portfolios formed by sorting the sample into *PBO-D* quintiles by year. Returns are accumulated starting three months after the fiscal year-end. Cumulative abnormal returns (CAR) are computed as $\sum_{i=0}^T R_i^* - \sum_{i=0}^T ER_t^*$, where R_t^* is monthly cumulative dividend return for stock i , ER_t^* is the corresponding expected return for that stock, and $t0$ and T represent the first and last months in our respective accumulation windows. The columns labeled CAPM reports CARs where expected returns are specified by the one-factor model: $ER_t^* = RF_t + b_i(MktRF_t)$, where RF_t is one-month T-bill return, and $MktRF_t$ is excess return on a value-weighted aggregate market proxy. RF , $MktRF$, SMB , and HML are obtained from Kenneth French's website (<http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/>). We estimate b_i during a hold-out period $[t-36, t-1]$ by regressing monthly stock excess return on the market excess return for each stock: $R_t^* - RF_t = a_i + b_i(MktRF_t) + e_{it}$. The columns labeled FF reports CARs where expected returns are specified by the three-factor Fama and French model: $ER_t^* = RF_t + b_1(MktRF_t) + b_2(SMB_t) + b_3(HML_t)$, where SMB_t is returns on zero-investment factor-mimicking portfolio for size; HML_t is returns on zero-investment factor-mimicking portfolio for book-to-market equity. We estimate b_1, b_2, b_3 during a hold-out period $[t-36, t-1]$ by regressing monthly stock excess return on the market excess return and two factor-mimicking portfolio returns for each stock: $R_t^* - RF_t = a_i + b_1(MktRF_t) + b_2(SMB_t) + b_3(HML_t) + e_{it}$. Panels B and C: The sample is drawn from all Compustat firms with non-missing pension and share price data from 1991 through 2000. The number of firm-year observations for all regressions is 8,187. We delete 1 percent of observations with the smallest and the largest values of studentized residuals to remove the effect of outliers. The dependent variable in all regressions is "ex post intrinsic value" at current fiscal year-end, which is calculated from the following equation:

$$IV_t = \sum_{i=1}^3 \frac{d_{t+i}}{(1+r)^i} + \frac{P_{t+3}}{(1+r)^3}$$
 where d is dividend, r is discount rate, and P is market capitalization. All variables except for *SALEGRW* and *EMP* are deflated by current-year sales. I_t is the dummy variable for each year from 1992 through 2000. Independent variables *NPAT*, *NPPTL*, *PA*, *PBO-X*, *PBO-D*, *NI*, *SALEGRW*, *R&D*, and *EMP* are defined in Table 2. p-values for coefficient estimates and their differences are two-sided and White (1980) adjusted. p-values for R² differences are based on Vuong's (1989) test statistic.

discretion in *PBO*). Further, the coefficient on *PBO* (-1.131) is higher than that on *PBO-X* (-1.024), although the difference is not statistically significant. Panel C reports results from the incremental association tests. Similar to our pricing results, we find that coefficient on *PBO-D* is negative and significant and statistically indistinguishable from the coefficient on *PBO-X*. Overall, the results from the *ex post* intrinsic value regressions are qualitatively similar to those from the price regressions, although the magnitudes of the coefficients on both *PBO* components are higher for the intrinsic value regressions.

In summary, evidence presented in this section suggests that market inefficiency is unlikely to explain our primary pricing results. However, we caution that our tests lack power to detect and control mispricing that is corrected over the long run, i.e., beyond the three-year horizon employed in our tests. Since pension obligations are notoriously long term in nature, there is some concern that our pricing results may arise from market mispricing that is reversed only over the long run. However, recent evidence (Franzoni and Marin 2005) suggests that the stock market corrects for mispricing related to pension funded status even over the short run, such as the three-year horizon used in our tests.²⁷ Although indirect, this evidence does suggest that our tests likely have the power to detect mispricing related to the discretionary *PBO* component.

VI. CONCLUSION

U.S. and International Accounting Standards are going through major changes as a result of the recent waves of accounting scandals. One of the issues that is at the heart of the debate is the degree of flexibility that should be allowed under GAAP. While many criticize that the flexibility accorded under GAAP allows managers to opportunistically manipulate accounting numbers, others believe that it allows managers to better communicate private information to financial statement users. Whether flexibility (discretion) improves or impairs the value relevance of financial statements is ultimately an empirical question. In this study, we examine this issue in the context of pension obligations. Specifically, we examine whether discretion in choosing pension assumptions—as currently allowed under U.S. GAAP—improves or impairs the value relevance of the pension obligation (*PBO*).

Our results show that allowing discretion does not impair the value relevance of the *PBO*. We also show that the discretionary component of pension liability, on average, is priced by the stock market in a similar manner to the nondiscretionary component. Overall, our results are consistent with discretion in the choice of pension obligations, on average, improving the communication of value-relevant information through the *PBO*. Our results have implications for the recent debate on principles-based versus rules-based standards (e.g., FASB 2004).

REFERENCES

- Aboody, D., J. Hughes, and J. Liu. 2002. Measuring value relevance in a (possibly) inefficient market. *Journal of Accounting Research* 40 (4): 965–986.
- Asthana, S. 1999. Determinants of funding strategies and actuarial choices for defined-benefit pension plans. *Contemporary Accounting Research* 16 (1): 39–74.

²⁷ Franzoni and Marin (2005) examine returns related to portfolios formed on pension-funded status over a five-year horizon. However, much of the excess returns from their strategy arise over the first three years after portfolio formation. Specifically, the annualized return differential between the most underfunded and the least underfunded deciles are 6.57 percent over a three-year horizon and 7.98 percent over a five-year horizon.

- Barth, M. E. 1991. Relative measurement errors among alternative pension asset and liability measures. *The Accounting Review* 66 (3): 433–463.
- , W. H. Beaver, and W. R. Landsman. 1992. The market valuation implications of net periodic pension cost components. *Journal of Accounting and Economics* 15 (1): 27–62.
- Bartov, E., P. Mohanram, and D. Nissim. 2004. Stock option expense, forward-looking information, and implied volatilities of traded options. Working paper, New York University and Columbia University.
- Beaver, W. H., and E. E. Engel. 1996. Discretionary behavior with respect to allowance for loan losses and the behavior of security prices. *Journal of Accounting and Economics* 22 (1–3): 177–206.
- , and M. F. McNichols. 1998. The characteristics and valuation of loss reserves of property casualty insurers. *Review of Accounting Studies* 3 (1–2): 73–95.
- , and ———. 2001. Do stock prices of property casualty insurers fully reflect information about earnings, accruals, cash flows, and development? *Review of Accounting Studies* 6 (2–3): 197–220.
- , and M. Venkatachalam. 2003. Differential pricing of components of bank loan fair values. *Journal of Accounting, Auditing and Finance* 18 (1): 41–66.
- Belsley, D. A., E. Kuh, and R. E. Welsch. 1980. *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*. New York, NY: Wiley.
- Bernard, V. L., and D. J. Skinner. 1996. What motivates managers' choice of discretionary accruals? *Journal of Accounting and Economics* 22 (1–3): 313–325.
- Blankley, A. I., and E. P. Swanson. 1995. A longitudinal study of SFAS No. 87 pension rate assumptions. *Accounting Horizons* 9 (4): 1–21.
- Borras, A., D. Dwyer, M. Arndt, and D. Welch. 2004. Pumped-up pension plays? Regulators are investigating how some companies tinker with retiree accounting. *BusinessWeek* (October 25).
- Brown, S., K. Lo, and T. Z. Lys. 1999. Use of R^2 in accounting research: Measuring changes in value relevance over the last four decades. *Journal of Accounting Economics* 28 (2): 83–115.
- Buffet, W., and K. Loomis. 2002. Warren Buffet on the stock market. *Fortune.com*.
- Chung, H., and S. Kallapur. 2003. Client importance, nonaudit services, and abnormal accruals. *The Accounting Review* 78 (4): 931–955.
- Dye, R. A., and R. E. Verrecchia. 1995. Discretion vs. uniformity: choices among GAAP. *The Accounting Review* 70 (3): 389–415.
- Fama, E. F., and K. R. French. 1997. Industry costs of equity. *Journal of Financial Economics* 43 (2): 153–193.
- Feldstein, M. S., and R. Morck. 1983. Pension funding decisions, interest rate assumptions, and share prices. In *Financial Aspects of the United States Pension System*, edited by Z. Bodie, and J. B. Shoven, 177–210. Chicago, IL: University of Chicago Press.
- Financial Accounting Standards Board. 2004. FASB response to SEC study on the adoption of a principles-based accounting system. Available at http://www.fasb.org/response_sec_study_july2004.pdf.
- Franzoni, F., and J. M. Marin. 2005. Pension plan funding and stock market efficiency. Working Paper, HEC School of Management, France, and Universitat Pompeu Fabra, Spain.
- Godwin, J. H., S. R. Goldberg, and J. E. Duchac. 1996. An empirical analysis of factors associated with changes in pension-plan interest-rate assumptions. *Journal of Accounting, Auditing and Finance* 11 (2): 305–322.
- Gopalakrishnan, V., and T. F. Sugrue. 1995. The determinants of actuarial assumptions under pension accounting disclosures. *Journal of Financial and Strategic Decisions* 8 (1): 35–41.
- Graham, J., C. Harvey, and S. Rajgopal. 2006. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40 (1–3): 3–73.
- Gramlich, J., M. McNally, and J. Thomas. 2001. Balance sheet management: The case of short-term obligations reclassified as long-term debt. *Journal of Accounting Research* 39 (2): 283–295.
- Greenwald, A. G. 1975. Consequences of prejudice against the null hypothesis. *Psychological Bulletin* 82 (1): 1–20.

- Guay, W. R., S. P. Kothari, and R. L. Watts. 1996. A market-based evaluation of discretionary-accruals models. *Journal of Accounting Research* 34 (Supplement): 83–105.
- Healy, P. M., and K. G. Palepu. 1993. The effect of firms' financial disclosure policies on stock prices. *Accounting Horizons* 7 (1): 1–11.
- , and J. M. Wahlen. 1999. A review of the earnings management literature and its implications for standard setting. *Accounting Horizons* 13 (4): 365–383.
- Holthausen, R. W., and R. Watts. 2001. The relevance of the value relevance literature for financial accounting standard setting. *Journal of Accounting and Economics* 31 (1–3): 3–75.
- Hunt, A., S. Moyer, and T. Shevlin. 1998. Earnings smoothing and equity value. Working paper, University of Washington, Seattle, WA.
- Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (2): 193–228.
- Kallapur, S. P., and S. Kwan. 2004. The value relevance and reliability of brand assets recognized by U.K. firms. *The Accounting Review* 79 (1): 151–172.
- Kothari, S. P., and J. Zimmerman. 1995. Price and return models. *Journal of Accounting and Economics* 20 (2): 155–192.
- Landsman, W. R. 1986. An empirical investigation of pension fund property rights. *The Accounting Review* 61 (4): 622–691.
- Lundelius, Jr., C. 2003. *Financial Reporting Fraud: A Practical Guide to Detection and Internal Controls*. New York, NY: AICPA. Available at: <https://www.cpa2biz.com/CS2000/Products/CPA2BIZ/Publications/Sub+3/Financial+Reporting+Fraud:+A+Practical+Guide+to+Detection+and+Internal+Control.htm>.
- McNichols, M. F. 2000. Research design issues in earnings management studies. *Journal of Accounting and Public Policy* 19 (4–5): 313–345.
- Morgan Stanley. 2003. *Yawn or Yell on Pension: An Update*. Global Valuation and Accounting Group, July 8. Philadelphia, PA: University of Pennsylvania Press.
- Ohlson, J. A. 1995. Earnings, book values, and dividends in equity valuation. *Contemporary Accounting Research* 11 (2): 661–688.
- Petroni, K. R., S. G. Ryan, and J. Wahlen. 2000. Discretionary and nondiscretionary revisions of loss reserves by property-casualty insurers: Differential implications for future profitability, risk and market value. *Review of Accounting Studies* 5 (2): 95–107.
- Sankar, M., and K. R. Subramanyam. 2001. Reporting discretion and private information communication through earnings. *Journal of Accounting Research* 39 (2): 365–386.
- Schipper, K. 1989. Commentary on earnings management. *Accounting Horizons* 3 (4): 91–102.
- Schultz, E. 2004. SEC investigates six companies on pension, benefit accounting. *Wall Street Journal* (October 18): A3.
- Stolowy, J., and G. Breton. 2004. Accounts manipulation: A literature review and proposed conceptual framework. *Review of Accounting & Finance* 3 (1): 5–68.
- Subramanyam, K. R. 1996. The pricing of discretionary accruals. *Journal of Accounting and Economics* 22 (1–3): 249–281.
- , and Y. Zhang. 2001. Does stock price reflect future service effects not included in the projected benefit obligation as defined in SFAS 87 and SFAS 32? Working paper, University of Southern California, and Columbia University.
- Tucker, J., and P. Zarowin. 2006. Does income smoothing improve earnings informativeness? *The Accounting Review* 80 (1): 251–270.
- Vuong, Q. H. 1989. Likelihood ratio tests for model selection and non-nested hypotheses. *Econometrica* 57 (2): 307–333.
- Wahlen, J. 1994. The nature of information in commercial banks loan loss disclosures. *The Accounting Review* 69 (3): 455–479.
- Watts, R., and J. Zimmerman. 1986. *Positive Accounting Theory*. Upper Saddle River, NJ: Prentice Hall.
- White, H. 1980. A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. *Econometrica* 48: 817–838.

Are M.B.A. Students a Good Proxy for Nonprofessional Investors?

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ABSTRACT: We investigate a key assumption underlying much of the experimental research in financial accounting that graduate business students are a good proxy for nonprofessional investors. To conduct our investigation, we categorize recent experimental studies in financial accounting, based on the relative level of integrative complexity inherent in each study's task. We then conduct experiments using two tasks, one that is relatively low in integrative complexity and one that is relatively high in integrative complexity, and compare the responses of two groups of M.B.A. students and nonprofessional investors.

Our results suggest that using M.B.A. students as a proxy for nonprofessional investors is a valid methodological choice, provided researchers give careful consideration to aligning a task's integrative complexity with the appropriate level of M.B.A. student. M.B.A. students who have completed their core M.B.A. courses and are enrolled in or have completed a financial statement analysis course are a good proxy for nonprofessional investors in tasks that are relatively low in integrative complexity. Though less definitive, the majority of our tests also suggest that these students are a good proxy for nonprofessional investors in tasks that are relatively high in integrative complexity. However, care must be taken when using students in the first-year core financial accounting course. In tasks that are relatively low in integrative complexity,

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these students perform similarly to nonprofessional investors except when they are asked to make an investment decision. In tasks that are relatively high in integrative complexity, these students acquire information similarly to nonprofessional investors, but they do not appear to integrate the information in a similar manner.

Keywords: *financial statement analysis; investor sophistication; experimental research in accounting.*

Data Availability: *Experimental data are available from the authors.*

I. INTRODUCTION

Approximately 41 million nonprofessional investors invest directly in the stock market (Securities Industry Association 2002). Many research topics of interest to experimental financial accounting researchers, accounting regulators, and standard setters concern the effects of financial reporting alternatives on the judgments and decisions of these investors. Nonprofessional investors, however, are a widely dispersed, heterogeneous group of individuals, which makes them difficult to recruit as participants in financial accounting experiments. As a result, experimental financial accounting researchers who are interested in the behavior of nonprofessional investors typically use graduate business students, most commonly Master's in Business Administration (M.B.A.) students, as a proxy for these individuals. No direct evidence exists, however, demonstrating that M.B.A. students are a good proxy for nonprofessional investors. This study investigates the assumption that M.B.A. students are a good proxy for nonprofessional investors in experimental studies.

A common criticism of prior experimental studies that examine financial reporting issues is that M.B.A. students recruited to complete a financial statement analysis or investment task are somehow different from actual nonprofessional investors and, therefore, results may not generalize. For example, the average M.B.A. student likely has less experience buying and selling equity securities than the average nonprofessional investor, but likely has greater formal training in accounting, finance, and other business subjects. The question is not whether M.B.A. students are better or worse than nonprofessional investors at performing financial analysis tasks, but rather whether their judgments and decisions are similar such that the conclusions drawn from studies using M.B.A. students will inform us about the likely behavior of nonprofessional investors. Libby et al. (2002) argue that experiments that focus on the judgments of nonprofessional investors only require participants who possess basic accounting and investing knowledge. M.B.A. students often have some accounting and investing knowledge and therefore could fit these criteria. In fact, Libby et al. (2002) caution against using market participants unless it is necessary to achieve a specific research goal because they are a valuable and scarce resource.¹

In this paper we discuss two key steps individuals carry out when completing a financial analysis task: information acquisition and information integration. In social psychology (e.g., Tetlock 1983; Lerner and Tetlock 1999), individuals' ability to integrate information when making judgments and decisions is discussed as a function of the information's integrative complexity, i.e., the complexity of connections involved in making a judgment or

¹ Nonprofessional investors are a heterogeneous population that we know little about, unlike the population of auditors. Although auditing research has investigated the reasonableness of students as surrogates for auditors, this literature does not apply to our research question. Auditors are professionals and auditing students are training to become professionals. In contrast, our focus is on M.B.A. students who likely have more accounting and finance training than the average nonprofessional investor and who are training to become managers, not nonprofessional investors. Though some M.B.A. students have investing experience, on average it is less than that of the nonprofessional investor population we wish to extrapolate to in experimental financial accounting research.

decision. After discussing integrative complexity, we classify recent experimental studies in financial accounting based on whether each study's task exhibits a relatively low or relatively high level of integrative complexity. Finally, we conduct experiments using two tasks, one that is relatively low in integrative complexity and one that is relatively high in integrative complexity, and compare the responses of M.B.A. students and nonprofessional investors.

Within each experiment, we test for differences in information acquisition and integration between nonprofessional investors and two groups of M.B.A. students: "early" M.B.A. students, who are midway through a core financial accounting course in the first year of an M.B.A. program, and "select" M.B.A. students, who have completed the first year of an M.B.A. program and have elected to take a financial statement analysis course. Our two student samples likely represent the lower and upper ends of the continuum of business, financial statement analysis, and investing knowledge within the M.B.A. student body, and reflect the range of students used in prior studies.² We believe our results will help guide future experimental research in financial accounting with regard to selecting appropriate participants. Our results will also inform groups, such as the Securities and Exchange Commission (SEC) and the Financial Accounting Standards Board (FASB), that consider financial accounting research that examines the behavior of M.B.A. students as nonprofessional investors in their deliberations and decisions.

Our first experimental task is similar to the task used in Hirst et al. (1995). Participants analyze a firm (Ultra Analyzers), its financial information, and an analyst report discussing the firm's performance and future potential. The analyst firm issuing the report either does or does not have an investment banking relationship with Ultra Analyzers. In completing this task, participants are expected to draw relatively simple connections between pieces of information for the purpose of making investment-related judgments and decisions. We classify this task as exhibiting a relatively low level of integrative complexity.

Overall, the results from experiment 1 indicate that early M.B.A. students, select M.B.A. students, and nonprofessional investors perform similarly, except when making investment decisions. Specifically, all three groups recognize that investment-banking relationships create incentives for analysts to optimistically bias their reports. As a result, the three groups make similar earnings potential and price appreciation judgments. However, the investment decisions of early M.B.A. students do not reflect this information to the same degree as do the investment decisions of select M.B.A. students and investors. These results suggest that early and select M.B.A. students acquire and integrate information for the purpose of making investment-related judgments similarly to nonprofessional investors when completing tasks that are relatively low in integrative complexity. Early M.B.A. students, however, may not be a good proxy if the task requires making an investment decision. It is important to note that many experiments focus on investment-related judgments, not decisions.

Our second experimental task is similar to the task used in Hodge et al. (2004). In this task, participants receive information about two firms (Firm D and Firm R) in the medical equipment and supplies industry, evaluate each firm's financial performance, calculate several ratios, and make investment decisions. Firm D discloses stock option compensation in the footnotes, while Firm R recognizes stock option compensation on the face of the income

² Prior studies use an array of M.B.A. students ranging from students in the first term of their first year to those in second-year electives, as well as different types of M.B.A. students, e.g., executive M.B.A. students, evening M.B.A. students, and daytime M.B.A. students.

statement. Firm D outperforms Firm R on four key income statement ratios *unless* participants put the two firms on equal footing with respect to stock option reporting (i.e., by either adjusting Firm D's income statement to reflect stock option compensation or adjusting Firm R's income statement to eliminate stock option compensation). Thus, Firm D *appears* to outperform Firm R due to differences in financial reporting choices, rather than differences in underlying economics.³ In completing this task, participants are expected to draw relatively complex connections between pieces of information in the financial statements and notes to the financial statements for the purpose of making investment-related judgments and decisions. We classify this task as exhibiting a relatively high level of integrative complexity.

The results from experiment 2 indicate that early M.B.A. students and select M.B.A. students acquire similar information to investors. Initial tests on whether early and select M.B.A. students integrate information similarly to investors in tasks that are relatively high in integrative complexity are ambiguous. Refining our integration tests by excluding participants who did not acquire relevant information, however, reflects that the judgments and decisions of early (select) M.B.A. students tend to be dissimilar (similar) to those of investors. In our refined tests, early M.B.A. students responded similarly to investors on only one of our five integration measures. In contrast, select M.B.A. students responded similarly on all five integration measures.

Following our primary analysis, we explore whether sorting early M.B.A. students on variables that proxy for effort, experience, and knowledge results in subsamples of students who are good proxies for nonprofessional investors. The variables we examine are: time required to complete the materials, investing experience, financial statement analysis experience, work experience, number of accounting and finance courses, and participants' performance on a financial literacy quiz. Median split tests on each of these variables fail to identify a subsample of early M.B.A. students who are good proxies for nonprofessional investors in experiment 1 and experiment 2.

In summary, using M.B.A. students as a proxy for investors is, in many instances, a valid methodological choice, but researchers must give careful consideration to aligning a task's integrative complexity with the appropriate level of M.B.A. student. Select M.B.A. students are a good proxy for nonprofessional investors in tasks that are relatively low in integrative complexity. Though less definitive, the majority of our tests also suggest that these students are a good proxy for nonprofessional investors in tasks that are relatively high in integrative complexity. Early M.B.A. students are also a good proxy for nonprofessional investors in tasks that are relatively low in integrative complexity, except when making investment decisions. For tasks that are relatively high in integrative complexity, early M.B.A. students acquire information similarly to nonprofessional investors, but they do not appear to integrate this information in a similar manner. Thus, for tasks that are relatively high in integrative complexity, we recommend that researchers recruit select M.B.A. students when actual nonprofessional investors are not available.

In the next section, we discuss integrative complexity, and detail how we classify the tasks used in prior experimental financial accounting studies based on their level of integrative complexity. In Sections III and IV we describe our two experimental settings and discuss the results. In Section V we sort early M.B.A. students based on their demographic

³ This task is representative of other tasks that involve the acquisition and integration of information provided in the notes to the financial statements regarding alternative accounting methods, e.g., operating versus capital leases and inventory methods.

characteristics to explore whether subsets of these individuals serve as good proxies for nonprofessional investors. Section VI summarizes our overall results and concludes.

II. THEORETICAL FRAMEWORK

Acquiring and Integrating Information

Individuals acquire and integrate information when making judgments and decisions (Hogarth 1980; Tetlock 1983; Lerner and Tetlock 1999). When researchers use M.B.A. students as a proxy for investors, they implicitly assume that these two groups acquire and integrate information in a similar manner, or at least that small differences in how each group completes these steps do not cause significant differences in the conclusions drawn from the results. We test the validity of this assumption by empirically evaluating whether early and select M.B.A. students acquire and integrate relevant information similar to investors when making investment-related judgments and decisions.

Within the accounting literature, Maines and McDaniel (2000) and Hodge et al. (2004) define information acquisition and integration. Information acquisition occurs when individuals identify and read specific pieces of relevant information sufficiently well to recall that information. Acquisition measures typically are not used as dependent variables in experimental studies examining financial accounting issues; they are most commonly included as manipulation checks. We are not interested in acquisition per se, but rather whether differences in information acquisition can help explain any potential differences in participants' subsequent judgments and decisions. Our primary focus, therefore, is on whether M.B.A. students and investors integrate information similarly when making judgments and decisions. Information integration involves two steps: evaluating the characteristics of the information, such as its consistency, and assimilating the various pieces of information to arrive at an overall judgment or decision.

In social psychology, individuals' ability to integrate information when making judgments and decisions is discussed as a function of the information's integrative complexity and consists of two components: differentiation and integration (Schroder et al. 1967; Streufert 1970; Streufert and Streufert 1978). According to Tetlock (1983) and Lerner and Tetlock (1999), differentiation refers to the number of distinct characteristics of an information set that an individual takes into account. Integration refers to the development of connections among these distinct characteristics and/or between these distinct characteristics and constructs independent of the information set. Essentially, "differentiation" and "integration" is evaluating and assimilating information in Maines and McDaniel's (2000) framework.

Classifying Prior Studies Based on their Level of Integrative Complexity

Given the important role that information acquisition and integration play in how individuals make judgments and decisions, we classify prior experimental studies in financial accounting based on the relative level of integrative complexity inherent in each study's task.⁴ It is important to note that integrative complexity is a relative rather than absolute

⁴ We recognize that experimental tasks can be classified using other dimensions. For example, our integration measure and integrative complexity are closely related to "task complexity" as defined by Bonner (1994). Bonner models task complexity as a function of the amount and clarity of information across three components of general information processing: input, processing, and output. Classifying tasks based on the amount and clarity of information requires an in-depth analysis of the experimental materials. We were unable to obtain copies of experimental materials for all the studies we classify in Table 1. For this reason, and for ease of exposition, we chose to classify our studies based on their level of integrative complexity.

measure. We therefore subjectively classify each task, dependent on whether it is relatively low or relatively high in integrative complexity. Relying on the definitions described above, we classify tasks that expect participants to draw relatively simple (complex) connections between distinct characteristics of the information set and subsequent judgments and decisions as relatively low (high) in integrative complexity.

Specifically, we classify 20 tasks from 19 recently published experimental financial accounting studies.⁵ As shown in Panel A of Table 1, we classified 14 of the tasks (70 percent) as exhibiting relatively low integrative complexity and six of the tasks (30 percent) as exhibiting relatively high integrative complexity. Below we describe two of the tasks that we classified as relatively low in integrative complexity and two of the tasks that we classified as relatively high in integrative complexity.

We classified Hirst et al. (1999) and Mercer (2005) as relatively low in integrative complexity. In Hirst et al. (1999) participants received either point or closed-range earnings forecasts issued by management with a reputation for either high or low forecast accuracy.⁶ Participants were expected to draw a relatively simple connection between the accuracy of management's prior forecasts and the form of the current forecast to make earnings predictions and provide confidence assessments of their earnings predictions. In Mercer (2005) participants received a disclosure from management describing either positive or negative earnings news, and the disclosure reflected either low or high forthcomingness. Participants were, again, expected to draw a relatively simple connection between management's forthcomingness and the sign of the earnings news when assessing management's reporting credibility.

In contrast to these two tasks, we classified the tasks in Kennedy et al. (1998) and Hirst et al. (2003) as relatively high in integrative complexity. In Kennedy et al. (1998) participants observed profitability, liquidity, growth, and share price information for two firms, Firm Q and Firm L. Firm Q reported a loss due to a litigation settlement that was certain, while Firm L reported a contingent environmental loss. Firm L disclosed an estimate of the loss in the environmental liability footnote in one of several forms: the most likely amount, the minimum, the maximum, or the range. Participants were expected to estimate the remaining parameters of the environment liability's distribution not provided in the footnotes (i.e., the minimum, maximum, and most likely amounts) and to estimate the amount they would have Firm L pay to resolve the contingency. Participants were expected to draw connections between each firm's financial information, managements' disclosure of the environmental liability, and their constructed distribution of the loss in order to assess the credibility of management's disclosures and the riskiness of each firm. Finally, participants were expected to use the information provided and their previous judgments to determine the percentage of capital they would invest in each firm. This task is relatively high in integrative complexity because management's choice of which parameter to disclose can be viewed as strategic and has subtle implications for the expected value of the loss, the credibility of the financial statements, the riskiness of the firm, and thus the desirability of investing in the firm relative to a firm with a known liability.

⁵ An author and an unaffiliated researcher independently classified each study based on the relative level of integration needed to complete each study's experimental task. The author and researcher classified 18 of the 20 tasks in the same manner (inter-rater reliability = 0.76), and reconciled differences on the other two as a group.

⁶ We do not discuss all of the information within a given study's task, but rather focus on the key attributes of each study. Most studies also contain other information, such as background information about the firm and general information about the firm's industry.

TABLE 1
Classification of Recent Experimental Studies in Financial Accounting that Use M.B.A. Students as Proxies for Investors

Panel A: Classification Matrix Based on the Relative Level of Integrative Complexity Inherent in Each Experimental Task*

<u>Relatively Low Integrative Complexity</u>	<u>Relatively High Integrative Complexity</u>
Bloomfield and Libby (<i>JAR</i> 1996)	Hirst, Jackson, and Koonce (<i>CAR</i> 2003)
Bloomfield, Libby, and Nelson (<i>AOS</i> 1999)	Hodge, Kennedy, and Maines (<i>TAR</i> 2004)
Bloomfield and Wilks (<i>TAR</i> 2000)	Kennedy, Mitchell, and Sefcik (<i>JAR</i> 1998)
Bloomfield, Libby, and Nelson (<i>CAR</i> 2003)	Krische (<i>TAR</i> 2005)
Elliott (<i>TAR</i> 2006)	Luft and Shields (<i>TAR</i> 2001)
Frederickson and Miller (<i>TAR</i> 2004)	Maines and McDaniel (<i>TAR</i> 2000)
Hirst, Koonce, and Simko (<i>JAR</i> 1995)	
Hirst, Koonce, and Miller (<i>JAR</i> 1999)	
Hodge (<i>TAR</i> 2001)	
Lipe (<i>AOS</i> 1998), task 1	
Lipe (<i>AOS</i> 1998), task 2	
Maines and Hand (<i>TAR</i> 1996)	
Mercer (<i>TAR</i> 2005)	
Nelson, Krische, and Bloomfield (<i>JAR</i> 2003)	

Panel B: Task Description for Studies that use M.B.A. Students as Proxies for Investors

<u>Study</u>	<u>Task Description</u>	<u>Relative Level of Integrative Complexity*</u>
Bloomfield and Libby (1996)	In a laboratory market, participants traded a security after observing two signals about the security's value. The signals were: "Value indicated by EPS = X price" or "Value indicated by OTHER information = X price."	Low
Bloomfield et al. (1999)	In a laboratory market, participants traded a security after receiving one or three signals about the security's value. The following signals were provided on 11-point scales: The rank order of a firm's return on equity (ROE); the rank order of a firm's growth in ROE; and the rank order of a firm's book value per share.	Low
Bloomfield and Wilks (2000)	In a laboratory market, participants traded a pair of securities after observing six of seven or two of seven signals about the variability of the securities' returns.	Low
Bloomfield et al. (2003)	In a laboratory market, participants predicted future return on equity (ROE) and made trading decisions after observing current and prior years' ROE.	Low
Elliott (2006)	In an experiment, participants made earnings potential judgments and an investment decision based on an earnings release that reported only GAAP earnings, emphasized either GAAP or pro forma earnings or provided a reconciliation of GAAP and pro forma earnings.	Low

(continued on next page)

TABLE 1 (Continued)

Frederickson and Miller (2004)	In an experiment, participants made stock price judgments based on an earnings release that reported only GAAP earnings or that reported both GAAP and pro forma earnings.	Low
Hirst et al. (1995)	In an experiment, participants made stock price appreciation judgments based on a report from an analyst who had (or did not have) an investment banking relationship with the firm. The report was either favorable or unfavorable and contained either strong or weak arguments.	Low
Hirst et al. (1999)	In an experiment, participants made earnings predictions and confidence assessments after receiving either point or closed-range earnings forecasts issued by management with either high or low forecasting accuracy.	Low
Hirst et al. (2003)	In an experiment, participants made earnings growth potential judgments and provided price-earnings multiples after receiving opportunistic or non-opportunistic estimates of future software sales and a related SEC disclosure that either included or excluded the effect on the financial statements of misestimating future product sales.	High
Hodge (2001)	In an experiment, participants made earnings potential judgments after evaluating a firm's audited financial statements and an optimistic unaudited letter to shareholders.	Low
Hodge et al. (2004)	In an experiment, participants made an investment decision between two firms: one that recognized stock option compensation expense and one that disclosed stock option compensation expense.	High
Kennedy et al. (1998)	In an experiment, participants decided how much to invest in a firm that disclosed a potential environmental liability as a range, a minimum/maximum, or the midpoint of a range.	High
Krische (2005)	In an experiment, participants made earnings forecasts based on a firm's current earnings release, which varied the information repeated about the firm's (previously disclosed) prior-year gain or loss on disposal.	High
Lipe (1998), task 1	In an experiment, participants made risk assessments and investment decisions after viewing 52 weeks of market prices for six firms or summarized information (e.g., variance and covariance measures) calculated from the weekly stock price data for the six firms. Participants also received information about the expected returns of the six firms.	Low

(continued on next page)

TABLE 1 (Continued)

Study	Task Description	Relative Level of Integrative Complexity ^a
Lipe (1998), task 2	In an experiment, participants made risk assessments and investment decisions after viewing market summary, accounting information, or combined market summary and accounting information for three unidentified NYSE firms. Market summary data were annual returns, variance of returns, and covariance of returns information. Accounting information was the firm's current ratio, leverage ratio, return on equity, variance in annual earnings price (E/P) ratios, and the covariance of annual E/P ratios.	Low
Luft and Shields (2001)	In an experiment, participants made future earnings predictions after receiving data on intangible expenditures and gross profits at 20 manufacturing plants. Expenditures are either capitalized or expensed.	High
Maines and Hand (1996)	In an experiment, participants made earnings forecasts after viewing a minimum of ten years of prior quarterly EPS information for each of two series. The two series were: a typical Brown-Rozeff series and a seasonal random walk, or series for two actual companies.	Low
Maines and McDaniel (2000)	In an experiment, participants assessed the risk of investing in a firm's stock and provided a per-share value for the stock after viewing financial information about the firm. The financial information provided information about the volatility of unrealized gains (losses) in one of three formats: SFAS No. 115 statement of stockholders' equity, SFAS No. 130 statement of stockholders' equity, or SFAS No. 130 statement of comprehensive income.	High
Mercer (2005)	In an experiment, participants assessed management's credibility after viewing a management disclosure that reflects either high or low management forthcomingness about positive or negative unexpected earnings news.	Low
Nelson et al. (2003)	In an experiment, participants made trading decisions after observing the recommendation of a trading strategy, along with predicted earnings growth, past earnings growth, and past sales growth.	Low

^a An author and an unaffiliated researcher independently classified each study based on the relative level of integrative complexity inherent in each study's experimental task. The author and researcher classified 18 of the 20 tasks in the same manner (inter-rater reliability = 0.76), and reconciled differences on the other two as a group. We classify experimental tasks that expect participants to draw relatively simple (complex) connections among the distinct pieces of information provided for the purpose of making investment-related judgments and decisions as relatively low (high) in terms of integrative complexity.

In Hirst et al. (2003) participants were provided with financial information for the current year and three previous years for a company that develops software products and capitalizes related development costs consistent with SFAS No. 86. Participants were provided with a summary of SFAS No. 86, and told that a new SEC rule required disclosure of the accuracy of prior estimates. As part of this new supplemental disclosure, participants were provided with management's original estimate of the software development asset for a three-year period, as well as the subsequently realized actual amount of the asset. Management's estimates of future software sales were either relatively accurate or opportunistic. In addition, the supplemental disclosure either provided or was silent about the implications of any mis-estimation of future software sales on the previous three years of reported software development assets and earnings.

Participants were expected to draw connections between the implications of management's past estimation accuracy on the reported software development asset and earnings, current financial performance, and the potential for earnings growth in order to estimate a price-earnings multiple. The authors conclude that disclosures must be sufficiently transparent in order for investors to make complex connections.

Before describing our two experimental settings, one that is relatively low in integrative complexity and one that is relatively high in integrative complexity, we discuss several factors that make it difficult to predict whether the judgments and decisions of early and select M.B.A. students will be similar to the judgments and decisions of nonprofessional investors.

Factors that May Influence Participants' Performance on a Task

Bonner and Lewis (1990) and Libby and Luft (1993) provide a framework for discussing potential reasons why information acquisition and integration might differ between M.B.A. students and nonprofessional investors. According to their models, experience and ability create participants' internal state of knowledge. Knowledge and ability determine performance.⁷

Ability is the mental capacity to acquire and use knowledge so as to accomplish the objective specified. Although ability is an unobservable internal state, results of standardized tests for college entrance and graduate programs, and employment history provide some indications of ability. For example, M.B.A. students presumably possess relatively high ability based on their performance on the Graduate Management Admissions Test (GMAT) required by most graduate business programs.⁸ Investors are likely to be more heterogeneous with respect to ability, but the simple fact that they continue to invest suggests that they likely possess some minimum level of ability. Although effects of ability are possible, the high likelihood that M.B.A. students and investors possess the requisite ability to complete financial analysis tasks likely weakens this link to performance relative to the other variables (Libby 1995).

Experience provides the opportunity for learning (Libby 1995). Learning depends on whether the experience accurately signals the need to learn and provides feedback that enables learning. For example, investors may make "good" investments in a bull market and attribute their success to their investment strategy or quality of analysis when, in fact, the success of their investment may be impervious to that investment strategy. "Errors"

⁷ Libby and Luft (1993, 433) also recognize the indirect role of effort: "Effort determines the degree to which available knowledge and abilities are brought to bear on the task and (along with abilities) determines the degree to which people acquire knowledge from experiences."

⁸ The lower end of acceptable GMAT scores in the M.B.A. programs of our participants is generally 650 (85th percentile), indicating high ability.

can only be corrected when it is clear why the error occurred and how to correct the action. As a person encounters more variations of market conditions that test their investment models or strategies, they receive more feedback, and thereby acquire more knowledge. We expect that investors, on average, have more investing experience than do early or select M.B.A. students and have therefore derived more investing-related knowledge from this experience.

M.B.A. students typically garner knowledge from reading source materials, such as textbooks, financial press articles, and class notes. M.B.A. students also typically conduct financial analysis, and make judgments and decisions based on their analysis, through case studies. Although M.B.A. students may acquire basic knowledge fairly early in the program, knowledge of business and investing likely increases as they progress through the program, are exposed to more cases and examples, and discuss investment-related issues with classmates. We expect that M.B.A. students early in the first year of the program will have less knowledge from formal education and training than M.B.A. students who have completed the first year of the M.B.A. program and are enrolled in an elective financial statement analysis course, and that both groups of M.B.A. students will have more formal-education-based knowledge than the average nonprofessional investor.

As the above discussion suggests, individuals possess multiple types of knowledge garnered from multiple sources, all of which can either facilitate, have no effect on, or hinder completing a given task. Whereas nonprofessional investors likely possess more experience-based knowledge about investing than M.B.A. students, M.B.A. students likely possess more formal-education-based knowledge about investing than nonprofessional investors. Although the “sources” of knowledge for each group likely differ, research has yet to examine whether their investing-related judgments and decisions differ.

III. EXPERIMENT 1

In our first experiment, we investigate whether M.B.A. students and nonprofessional investors acquire and integrate information similarly when completing an experimental task that is relatively low in integrative complexity.

Task and Procedure

Our experimental task is similar to the task used in Hirst et al. (1995). We do not replicate Hirst et al. (1995), but rather use their overall experimental design to examine our research question. Hirst et al. (1995) manipulate three independent variables: the source of a research report (an analyst with or without an investment banking relationship with the firm), the report’s conclusion (favorable or unfavorable), and the strength of arguments supporting the conclusions (strong or weak). We hold the report’s conclusion and strength of arguments constant at “favorable” and “strong,” and manipulate the source of the research report in our experimental task.

Participants received the experimental materials at the end of class (M.B.A. students) or in the mail (investors). Each set of experimental materials contained two booklets. Booklet One consisted of information about a firm (Ultra Analyzers) in the infrared gas analyzer industry, including an industry overview, income statements, balance sheets, select ratios for the last three years, and an analyst report from a securities firm (American Financial). We manipulated whether American Financial has, or does not have, an investment banking relationship with Ultra Analyzers. After analyzing this information, participants answered several questions about Ultra Analyzers’ earnings potential and price appreciation, about the credibility of American Financial’s research report, and about the independence of American Financial.

At the end of Booklet One, separated from the other information, was additional information about Ultra Analyzers' performance relative to the performance of two other firms (Firm H and Firm Z) in its industry.⁹ This additional information revealed that Ultra Analyzers' performance was currently slightly below that of Firm H and Firm Z. The analyst report suggested, however, that over the next 12 months Ultra Analyzers would begin to outperform the other two firms. After reviewing this information, participants decided what percentage of \$10,000 to invest in each of the three firms. They then completed Booklet Two, which contained manipulation-check questions, demographic questions, and a financial literacy quiz of 15 questions.¹⁰

We classify this task as relatively low in integrative complexity because the basic connection that participants are expected to make is between the incentives that investment banking relationships create and analysts' reports. If participants make this connection, then their performance evaluations should be correspondingly lower in the investment banking condition.

Participants

One hundred twenty-four M.B.A. students from a large state university and 37 non-professional investors serve as participants. Eighty-two of the students were midway through the core financial accounting course in the first term of the first year of their M.B.A. program. We refer to these participants as "early" M.B.A. students. The other 42 students had completed the first year of the M.B.A. program and were enrolled in a financial statement analysis elective. We refer to these participants as "select" M.B.A. students. Our two student groups likely represent the lower and upper ends of the continuum of financial statement analysis and investing knowledge within the M.B.A. student body, and reflect the range of students used in prior experimental studies in financial accounting. Our 82 early (42 select) M.B.A. students have an average of 5.2 (5.9) years of work experience and 2.9 (3.9) years of experience investing in the common stock or debt securities of firms. Early (select) M.B.A. students have taken an average of 1.8 (3.5) accounting, 1.0 (2.9) finance classes, and 35 (66) percent have evaluated a company's performance by analyzing financial statements more than five times.¹¹

Comparing the M.B.A. program from which we recruited our participants ("our program") to the top 30 M.B.A. programs reported by *BusinessWeek* magazine reveals that our program is representative of other top M.B.A. programs across several measures. For 2004, *BusinessWeek* reported that the median GMAT score for our program was 680 and the average years of work experience was 5.3 years. The median GMAT score for the top 30 M.B.A. programs in the rankings was 683 and the average years of work experience was 4.9 years (*BusinessWeek* 2004).¹²

⁹ This information was not provided in Hirst et al. (1995) because they did not ask for investment decisions.

¹⁰ Nine of the 15 items on our financial literacy quiz are adapted from or identical to questions that Katherine Schipper of the FASB and Roman Weil of the University of Chicago use at various educational programs for corporate directors. Approximately 1,500 directors have completed their full quiz, which consists of 25 questions. Our remaining six items are from an introductory accounting class' final exam.

¹¹ We use our demographic variables in subsequent exploratory analysis. For the sake of brevity, we report descriptive statistics for these variables only once, in Table 7.

¹² *BusinessWeek* does not report incoming grade point averages (GPAs) in its rankings, but *U.S. News & World Report* does. In 2004, *U.S. News* reports that the average incoming GPA for our program was 3.40/4.00 (*U.S. News & World Report* 2004). The average incoming GPA across the top 30 schools in the *U.S. News & World Report* rankings is also 3.40/4.00. Our early and select participants have a median GMAT score of 675, an average GPA of 3.5, and have worked an average of 5.5 years before entering the M.B.A. program.

The investors who completed the experiment are members of the National Association of Investors Corporation (NAIC). We believe this group of investors meets the FASB's criteria that users of financial reports "have a reasonable understanding of business and economic activities and are willing to study the information with reasonable diligence" (FASB 1978). The NAIC consists of approximately 300,000 individual and investment club members with a total portfolio value greater than \$116 billion (NAIC 2003). Nine out of ten NAIC club members buy securities for their own accounts in addition to making club investments (O'Hara and Janke 1998). We obtained our investor sample from a NAIC regional chapter's membership base. Participants indicated their willingness to participate while completing a survey administered by a regional chapter of the NAIC in 2001. Of our 37 participants, 53 percent are female, the median age is 50–59 years, they have been investing for an average of 14 years, and 76 percent have a college education. The membership base of the NAIC as a whole is 67 percent female, the median age is 56 years, and 74 percent of members have a college education (NAIC 2003). All of our nonprofessional investors have invested in debt or equity securities and 77 percent have evaluated a company's performance by evaluating its financial statements more than five times. On average, they have taken 1.9 and 1.6 accounting and finance courses, respectively.¹³

Results

Consistent with other experimental research (e.g., Maines and McDaniels 2000; Hodge et al. 2004), we analyze participants' information acquisition and integration. Our purpose in doing so is *not* to measure performance per se, but rather to examine whether early and select M.B.A. students acquire and integrate information similarly to nonprofessional investors such that any conclusions drawn from the analysis are the same regardless of participant type.

Acquisition

We measure acquisition by asking participants three questions: (1) whether American Financial had an investment banking relationship with Ultra Analyzers, (2) whether the stock research report issued by American Financial was favorable or unfavorable toward Ultra, and (3) whether American Financial's research report covered only Ultra Analyzers, only Firm H, only Firm Z, or all three firms. As shown in Panel A of Table 2, 97 percent of nonprofessional investors correctly answered the question of whether American Financial had an investment banking relationship with Ultra Analyzers compared to 81 percent of early M.B.A. students and 86 percent of select M.B.A. students. Although correct response rates were high for all three groups, Panel B shows that the rate for nonprofessional investors is higher than that for early ($\chi^2 = 5.88$, $p = 0.02$) and select ($\chi^2 = 3.30$, $p = 0.07$) M.B.A. students. There were no acquisition differences on the second question regarding the favorability of the stock report as all participants responded correctly. Similarly, nearly all participants correctly answered the third question asking which firms American Financial covered (all p -values > 0.32).

In conclusion, it seems that most participants in each group acquired the distinct characteristics of the task, although approximately 19 percent of the early M.B.A. students and 14 percent of the select M.B.A. students missed an important fact, i.e., the presence or

¹³ The NAIC does not publish information on the investing experience of its membership base. Hodge (2003), however, reports that the 414 NAIC investors who completed the NAIC regional chapter's survey in 2001 have an average of 9.9 years of investing experience. These investors are 68 percent female, their median age is between 50–59 years, and 75 percent have a college education.

TABLE 2
Experiment 1 Acquisition Variables

Panel A: Descriptive Statistics

Dependent Variable	Early M.B.A. ^a n ≈ 82	Investor n ≈ 37	Select M.B.A. n ≈ 42
1: Did American Financial have a position in the securities of Ultra Analyzers? ^b			
Correct	81%	97%	86%
Incorrect	19%	3%	14%
2: Was the common stock research report issued by American Financial for Ultra Analyzers unfavorable or favorable? ^b			
Correct	100%	100%	100%
Incorrect	0%	0%	0%
3: Did American Financial issue a common stock research report for only Ultra Analyzers, only Firm H, only Firm Z, or for all three firms? ^b			
Correct	93%	97%	93%
Incorrect	7%	3%	7%

Panel B: Planned Comparisons by Participant Group

Variable	Early vs. Investor	Select vs. Investor	Early vs. Select
1	$\chi^2 = 5.88, p = 0.02$	$\chi^2 = 3.30, p = 0.07$	$\chi^2 = 0.52, p = 0.47$
2	$\chi^2 = 0.00, p = 1.00$	$\chi^2 = 0.00, p = 1.00$	$\chi^2 = 0.00, p = 1.00$
3	$\chi^2 = 0.98, p = 0.32$	$\chi^2 = 0.85, p = 0.36$	$\chi^2 = 0.00, p = 1.00$

^a Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.

^b "Correct" is the percentage of participants who correctly answered the question.

absence of an investment banking relationship. This may be due to these participants paying less attention, which we consider in Section V.

Integration

To assess information integration we first asked questions pertaining to the relation between investment banking relationships and analysts' research reports to determine whether participants understood how analysts' incentives could influence their reports. Specifically, we asked about the credibility of American Financial's stock report and about American Financial's independence. These two questions are highly related ($\alpha = .80$); thus, we report results using a simple-average composite measure. We report descriptive statistics in Panel A of Table 3 and test for differences in Panel B. Results reveal that the composite measure for all three participant groups was significantly influenced by the investment banking relationship in a consistent manner (all p-values < 0.01).¹⁴

We next asked participants to judge the extent to which American Financial's stock report was influenced by incentives to please Ultra Analyzer's management. Results in Panel B of Table 3 reveal a significant investment banking effect across all three participant groups

¹⁴ Results are inferentially identical if we examine the credibility and independence judgments separately.

TABLE 3
Experiment 1 Integration Variables

Panel A: Descriptive statistics [mean (standard deviation)] for Non-Investment Banking (NIB) and Investment Banking (IB) Conditions									
Dependent Variable	Early M.B.A. ^a			Investor			Select M.B.A.		
	NIB ^b n = 40	IB n = 42		NIB n = 18	IB n = 19		NIB n = 19	IB n = 23	
1: Credibility/Independence Composite ^c	6.8 (1.9)	4.8 (2.3)		6.8 (1.8)	3.7 (2.4)		7.3 (2.2)	4.3 (2.0)	
2: Incentive to please management ^d	4.9 (2.5)	6.4 (2.5)		5.3 (2.7)	8.0 (1.9)		4.6 (2.9)	6.9 (2.4)	
3: Earnings potential ^e	7.2 (1.3)	6.8 (1.7)		5.6 (1.8)	5.1 (1.7)		7.2 (1.9)	7.1 (1.9)	
4: Price appreciation ^f	7.0 (1.7)	6.4 (2.1)		5.4 (2.0)	5.1 (2.1)		6.6 (1.9)	6.4 (2.1)	
5: Percent who prefer to invest in Ultra Analyzers ^g	60%	59%		50%	5%		84%	39%	
6: Percent of \$10,000 invested in Ultra Analyzers ^g	43% (20%)	42% (21%)		47% (32%)	13% (16%)		54% (23%)	35% (8%)	
Panel B: Planned Comparisons for each Participant Group by Investment Banking Condition									
Variable	Early NIB vs. Early IB			Investor NIB vs. Investor IB			Select NIB vs. Select IB		
1	t = 4.31, p < 0.01			t = 4.40, p < 0.01			t = 4.62, p < 0.01		
2	t = 2.60, p = 0.01			t = 3.52, p < 0.01			t = 2.75, p < 0.01		
3	t = 1.30, p = 0.21			t = 0.90, p = 0.37			t = 0.05, p = 0.96		
4	t = 1.40, p = 0.17			t = 0.52, p = 0.61			t = 0.38, p = 0.71		
5	$\chi^2 = 0.00$, p = 0.97			$\chi^2 = 9.40$, p < 0.01			$\chi^2 = 8.80$, p < 0.01		
6	t = 0.17, p = 0.87			t = 4.10, p < 0.01			t = 3.30, p < 0.01		

(continued on next page)

TABLE 3 (Continued)

* M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.
^b The "NIB" ("IB") column presents descriptive statistics for those participants assigned to the condition where American Financial does not have (does have) an investment banking relationship with Ultra Analyzers.
^c Our composite measure is the simple average of participants' responses to a credibility and an independence question. These two measures are related ($\alpha = .80$) and both are measured on an 11-point scale. The credibility question asked "How credible is the common stock research report issued by American Financial for Ultra Analyzers?" with endpoints labeled "not at all credible" and "very credible." The independence question asked participants to respond to the following: "I believe American Financial was in a position to be _____ with respect to Ultra Analyzers," with endpoints labeled "not at all independent" and "completely independent."
^d We asked participants "To what extent do you believe each of the following factors influenced American Financial when they were formulating their conclusion that Ultra Analyzer exhibits very strong potential for price appreciation over the next 12 months." Participants rated "American Financial's desire to please management" on an 11-point scale with endpoints labeled "very little influence" and "very large influence."
^e Participants responded to the following question: "I believe that Ultra Analyzers' earnings potential for fiscal year 2005 is _____. " [very weak (1) to very strong (11)]
^f Participants responded to the following question: "I believe that Ultra Analyzers' stock has _____ potential for price appreciation in fiscal 2005." [very low (1) to very high (11)]
^g Participants responded to the following question: "Recall that you have decided to invest \$10,000 in the infrared gas analyzer industry. What percentage of the \$10,000 would you invest in each firm (the total must add up to 100)?" Participants indicated the percentage that they would invest in Firm H, Firm Z, and Ultra Analyzers. We examine two investment decision dependent measures: (1) the percentage of participants who invested the majority of their funds in Ultra Analyzers (question 5), and (2) the percentage of the \$10,000 that participants invested in Ultra Analyzers (question 6). Our first decision variable is coded 1 if participants invested the majority of their funds in Ultra, and 0 otherwise.

(all p -values ≤ 0.01).¹⁵ These results suggest that early M.B.A. students, select M.B.A. students, and nonprofessional investors similarly assess the effect an investment banking relationship can have on analyst reports.

To further examine information integration we examine participants' earnings potential judgments and their share price appreciation judgments. Results in Panel B of Table 3 reveal that for all three participant groups, the investment banking relationship did not significantly influence their earnings potential or price appreciation judgments (all p -values ≥ 0.17). Our lack of a price appreciation effect is consistent with the findings of Hirst et al. (1995).

Our final test of integration is whether participants' investment decisions are similarly influenced by the investment banking relationship. Recall that we designed our experiment such that Ultra Analyzers is currently underperforming Firms H and Z, but is expected to start outperforming its two competitors over the next 12 months according to the research report. If participants believe the research report to be credible, then they are likely to invest more of their \$10,000 in Ultra Analyzers than will participants who do not believe the report is credible. We examine this final component of integration by asking participants' to allocate an investment of \$10,000 to Ultra Analyzers, Firm H, and/or Firm Z. We examine two investment decision dependent measures: (1) the percentage of participants who invested the majority of their funds in Ultra, and (2) the percentage of the \$10,000 that participants invested in Ultra Analyzers.

Our first decision variable is coded 1 if participants invested the majority of their funds in Ultra, and 0 otherwise. We use a dichotomous variable in addition to the percentage of the \$10,000 that participants invested to reduce the opportunity for participants to simply allocate an equal percentage of the \$10,000 between the firms. We report descriptive statistics for our investment decision variables in Panel A of Table 3 and test for differences in Panel B.

The results show that across both of our investment decision variables, nonprofessional investors and select M.B.A. students are more likely to invest in Ultra Analyzers in the non-investment banking condition than in the investment banking condition (all p -values < 0.01). In contrast to these two groups, early M.B.A. students are not more likely to invest in Ultra Analyzers in the non-investment banking condition (all p -values ≥ 0.87). Importantly, these results are not due to acquisition failure as results using only early M.B.A. students who passed all of the acquisition hurdles (i.e., answered all of the manipulation check questions correctly) are qualitatively similar. Thus, it appears early M.B.A. students do not integrate information similarly to nonprofessional investors when making investment decisions. As a result, conclusions drawn about the effect of an investment banking relationship on participants' investment decisions would differ if one were to use early M.B.A. students as proxies for nonprofessional investors, rather than select M.B.A. students or actual nonprofessional investors.¹⁶

Based on the above results, select M.B.A. students are good surrogates for nonprofessional investors in tasks that are relatively low in integrative complexity. Early M.B.A. students seem to acquire and integrate information similarly to nonprofessional investors

¹⁵ In addition to asking participants to judge the extent to which American Financial's stock report was influenced by incentives to please Ultra Analyzer's management, we also ask participants the extent to which the stock report reflects American Financial's true beliefs about Ultra Analyzer's future performance. Similar to Hirst et al. (1995), we compute a variable called "Incentive," which is the difference between the responses to these two questions. Consistent with Hirst et al. (1995), results (not tabulated) reveal a significant investment banking effect across all three participant groups (all p -values ≤ 0.01).

¹⁶ Our experiment 1 integration results are inferentially identical using nonparametric tests.

except when making investment decisions. This suggests that early M.B.A. students are good surrogates for investors when the research question focuses on non-investment decision dependent variables.

IV. EXPERIMENT 2

In our second experiment we investigate whether the conclusions drawn from using M.B.A. students versus nonprofessional investors would differ when completing a task that is relatively high in integrative complexity.

Task and Procedure

Our task is similar to the task used in Hodge et al. (2004). We do not replicate Hodge et al. (2004), but rather use their overall experimental design to examine our research question. Focusing on stock option compensation expense, Hodge et al. (2004) examined the benefits of using search-facilitating software to analyze financial statements and footnotes. Our second task mirrors their stock option compensation expense setting, but does not investigate the benefits of using search-facilitating technology.

Participants began the experiment by clicking on a link embedded in an email. Participants then reviewed an instructions page, a page containing general information about the medical supplies industry, and a preview of questionnaire #1, which elicited the primary dependent variables. Participants began their firm-specific analysis by analyzing the financial statements and footnotes for two firms (Firm D and Firm R) in the medical equipment and supplies industry. Firm D discloses stock option compensation in the footnotes, while Firm R recognizes stock option compensation on the face of the income statement. Firm D outperforms Firm R on four key income statement ratios *unless* participants put the two firms on equal footing with respect to stock option reporting (i.e., by either adjusting Firm D's income statement to reflect stock option compensation or adjusting Firm R's income statement to not reflect stock option compensation). Thus, Firm D *appears* to outperform Firm R due to differences in financial reporting choices, rather than differences in underlying economics.

After examining each firm's financial information, participants computed four ratios for each firm, assessed each firm's financial performance, and made an investment decision. After submitting this questionnaire, participants completed a second questionnaire that contained manipulation check questions and gathered demographic information. The case concluded with the same 15-question financial literacy quiz used in experiment 1.

This task is relatively high in integrative complexity because participants who read and understand the footnotes will realize that the two firms differ in their accounting policy for stock options and that the pro forma earnings of Firm D disclosed in the notes are more comparable to the reported earnings of Firm R. When participants recognize this reporting discrepancy and adjust to put the two firms on equal footing, the materials are designed so that Firm R outperforms Firm D. In contrast, participants who do not integrate the information sufficiently well to recognize the reporting discrepancy should favor Firm D; the firm with the highest reported net income.

Participants

We recruited 155 early and select M.B.A. students from the same large state university from which we recruited participants for experiment 1. Experiment 2 was completed almost exactly one year prior to experiment 1; the early and select M.B.A. students in both experiments had covered approximately the same classroom material at the time of each experiment. One hundred twenty-four of the M.B.A. students are early students and 31 are

select students.¹⁷ Our nonprofessional investor group consists of 58 individuals, 31 of whom also completed experiment 1. The demographics of our participants in this experiment are nearly identical to those in experiment 1.

Results

As with experiment 1, in experiment 2 we are not interested in measuring performance per se, but rather in examining whether early and select M.B.A. students acquire and integrate information similarly to nonprofessional investors such that any conclusions drawn from the analysis are the same regardless of participant type.

Acquisition

We investigate acquisition in three ways. First, we use tracking software to capture whether participants clicked on the footnotes when viewing the materials. Second, we ask participants whether they viewed the footnotes for Firm D and Firm R. Third, we ask participants to identify whether Firm D and Firm R disclosed or recognized stock option compensation information.

As shown in Panel A of Table 4, our tracking software recorded that 66 percent of the early M.B.A. students, 70 percent of the select M.B.A. students, and 67 percent of the investors clicked on the footnote information link in the experimental materials. Results reported in Panel B reveal that the percentages for early and select M.B.A. students do not significantly differ from the percentage for nonprofessional investors (all p -values ≥ 0.69). Results for our second acquisition measure also reveal that early M.B.A. students and select M.B.A. students acquired similar information to investors (all p -values $p \geq 0.23$).

Our third acquisition measure examines whether participants read and were able to recall whether Firm D and Firm R recognized on the face of the income statement or disclosed in the footnotes stock option compensation information. As shown in Panel A of Table 4, 42 percent (65 percent) of early (select) M.B.A. students correctly recall how each firm reported stock option compensation information, while 55 percent of investors correctly recall this information. Statistical tests in Panel B reveal that the investors performed marginally better than the early M.B.A. students ($p = 0.09$), but not significantly worse than the select M.B.A. students ($p = 0.39$), on this acquisition measure.

Integration

We first examine information integration by asking participants to assess financial statement reliability and management credibility for Firm D and Firm R. We are not interested in the magnitude of participants' responses, but rather whether the conclusions that a researcher would draw from using early or select M.B.A. students' responses would differ from the conclusions drawn from using actual nonprofessional investors' responses. When two firms are analyzed side by side, differences in their reporting choices are highlighted. Given that the FASB has consistently stated that recognition is the conceptually appropriate accounting method for stock option compensation, a decision by a firm's manager to disclose this information may raise questions about the reliability of the firm's financial statements and the credibility of the firm's management. Accordingly, we conjecture that participants who understand the implications of the two firms' reporting choices are likely to

¹⁷ Twenty-six of our select M.B.A. students are from one university, and five are from another. GMAT (671 versus 673), work experience (5.3 years versus 5.1 years), and average GPA (3.40 versus 3.35) metrics are virtually identical across the two programs. Removing the five participants does not alter the significance of our statistical tests or our conclusions. We include them to increase the power of our tests.

TABLE 4
Experiment 2 Acquisition Variables

Panel A: Descriptive Statistics			
Dependent Variable		Early M.B.A. ^a n = 124	Investor n = 58
1: Did participants view the firms' footnotes? (as recorded by tracking software)			Select M.B.A. n = 31
	Both firms		
	Only one firm or neither firm	66%	67%
		34%	33%
2: Did participants view the firm's footnotes? (as reported by participant)			
	Both firms	71%	79%
	Only one firm or neither firm	29%	21%
3: Did Firm D or Firm R include the cost of employee stock options in salary expense on the income statement? ^b			
	Correct	42%	55%
	Incorrect	58%	45%

Panel B: Planned Comparisons by Participant Group			
Variable	Early vs. Investor	Select vs. Investor	Early vs. Select
1	$\chi^2 = 0.01, p = 0.90$	$\chi^2 = 0.07, p = 0.79$	$\chi^2 = 0.16, p = 0.69$
2	$\chi^2 = 1.42, p = 0.23$	$\chi^2 = 0.27, p = 0.60$	$\chi^2 = 2.12, p = 0.15$
3	$\chi^2 = 2.80, p = 0.09$	$\chi^2 = 0.73, p = 0.39$	$\chi^2 = 5.08, p = 0.02$

^a Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.

^b "Correct" is the percentage of participants who correctly answered that Firm D disclosed and Firm R recognized stock option compensation information.

rate the recognizing firm's financial statements as more reliable and the firm's management as more credible.

Our reliability and credibility questions for Firm D are related ($\alpha = .92$) as are the reliability and credibility questions for Firm R ($\alpha = .88$). We therefore only tabulate results using a simple-average composite measure.¹⁸ We report descriptive statistics in Panel A of Table 5 and test for differences in Panel B. Results reveal that the composite measure for Firm R is greater than the composite measure for Firm D across all three participant groups (all p -values < 0.01). This suggests that early M.B.A. students, select M.B.A. students, and nonprofessional investors all assessed the implications of Firm D disclosing and Firm R recognizing stock option compensation information in a similar manner.

We further examine information integration by examining participants' financial performance judgments, a ratio adjustment variable, the percentage of participants who chose to invest all of their \$10,000 in Firm B, and the percentage of \$10,000 that participants elected to invest in Firm B when given the choice to split their investment choice between the two firms. We report descriptive statistics for these variables in Panel A of Table 5 and test for differences in Panels B and C.

Results reveal that early M.B.A. students and investors both judged the financial performance of Firm D to be greater than the financial performance of Firm R (all p -values ≤ 0.05). In contrast, select M.B.A. students judged the financial performance of the two firms to be similar ($p = 0.37$). The ratio adjustment variable is the number of participants in each participant group who adjusted compensation expense in their computation of a key ratio. The ratio was labeled the "human capital productivity ratio." The materials describe this ratio as "total sales/total employee compensation." Recall that if participants put the two firms on equal footing with respect to their reporting of stock option compensation expense, then Firm R dominates Firm D on this ratio. In analyzing this ratio, we categorize participants into those who made adjustments to put the two firms on equal footing and those who did not. As shown in Panel A of Table 5, only 17 percent of early M.B.A. students made adjustments to put the two firms on equal footing, while 33 percent of investors and 45 percent of select M.B.A. students did so. Statistical tests in Panel C show that the percentages of select M.B.A. students and investors who made adjustments to put the firms on equal footing do not differ ($p = 0.30$). In contrast, more investors than early M.B.A. students put the firms on equal footing ($p \leq 0.01$).

The first investment variable we examine is the percentage of participants who prefer to invest all of their \$10,000 in Firm R. We expect participants who put the two firms on equal footing to be more likely to invest their \$10,000 in Firm R than Firm D. As shown in Panel A of Table 5, 37 percent of investors and 42 percent of select M.B.A. students prefer to invest all of their \$10,000 in Firm R, while only 19 percent of early M.B.A. students prefer to do so. As shown in Panel C of Table 5, early M.B.A. students' preference for Firm R is significantly less than investors' preference ($p = 0.01$). Select M.B.A. students' preference for Firm R does not differ from investors' preference ($p = 0.62$). Our second investment variable examines participants' investment decisions when they are allowed to allocate their investment dollars (\$10,000) to both firms. As shown in Panel A of Table 5, investors allocate 40 percent of their investment to Firm R, compared to 36 percent for early M.B.A. students ($p = 0.32$) and 52 percent for select M.B.A. students ($p = 0.10$).

The above results are ambiguous with respect to whether early or select M.B.A. students integrate information similarly to investors in tasks that are relatively high in integrative

¹⁸ Results are inferentially identical if we examine the reliability and credibility judgments separately.

TABLE 5
Experiment 2 Integration Variables

Panel A: Descriptive Statistics [mean (standard deviation)]

Dependent Variable		Early M.B.A. ^a n ≈ 124	Investor n ≈ 58	Select M.B.A. n ≈ 31
1: Reliability/Credibility Composite ^b				
	Firm D	7.4 (1.8)	6.3 (2.5)	6.6 (2.3)
	Firm R	8.1 (1.4)	7.7 (1.8)	8.1 (1.1)
2: Financial Performance ^c				
	Firm D	7.2 (2.0)	6.9 (2.5)	6.1 (2.7)
	Firm R	6.3 (1.7)	5.9 (1.8)	6.8 (2.2)
3: Percent who put Firm D and Firm R on equal footing ^d		17%	33%	45%
4: If you had to invest all \$10,000 in one firm, which firm would you invest in?				
	Firm D	81%	63%	58%
	Firm R	19%	37%	42%
5: If you could invest in both firms, what percentage would you invest in each?				
	Firm D	64% (26%)	60% (33%)	48% (33%)
	Firm R	36% (26%)	40% (33%)	52% (33%)

Panel B: Paired Comparisons by Participant Group

Variable	Early M.B.A.	Investor	Select M.B.A.
1	t = 4.30, p < 0.01	t = 4.22, p < 0.01	t = 3.71, p < 0.01
2	t = 4.38, p < 0.01	t = 2.08, p = 0.04	t = 0.92, p = 0.37

Panel C: Planned Comparisons by Participant Group

Variable	Early vs. Investor	Select vs. Investor	Early vs. Select
3	$\chi^2 = 6.30, p = 0.01$	$\chi^2 = 1.22, p = 0.30$	$\chi^2 = 11.30, p < 0.01$
4	$\chi^2 = 6.31, p = 0.01$	$\chi^2 = 0.24, p = 0.62$	$\chi^2 = 6.82, p < 0.01$
5	t = 0.99, p = 0.32	t = 1.67, p = 0.10	t = 2.57, p = 0.01

(continued on next page)

TABLE 5 (Continued)

^a Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.
^b Our composite measure is the simple average of participants' responses to a reliability and a credibility question for Firm D (Firm R). Both questions are measured on 11-point scales. The reliability questions asked participants to respond to the following "I believe Firm D's (Firm R's) financial statements are _____," with endpoints labeled "not at all reliable" and "very reliable." The credibility questions asked participants to respond to the following "I believe Firm D's (Firm R's) management is _____," with endpoints labeled "not at all credible" and "very credible."
^c We measured financial performance by asking participants to respond to the following on an 11-point scale "I believe Firm D's (Firm R's) financial performance for the year ended June 30, 2003 was _____," with endpoints labeled "very weak" and "very strong."
^d This number represents the percentage of participants in each participant group who either adjusted Firm D's or Firm R's stock option compensation number to put the two firms on equal footing.

complexity. To shed additional light on this issue, we reran our integration tests using only participants who correctly answered our three acquisition measures. Doing so allows us to focus exclusively on information integration rather than a combined measure of acquisition and integration. The results reported in Table 6 are consistently stronger and reflect that the judgments and decisions of early (select) M.B.A. students tend to be dissimilar (similar) to those of investors.¹⁹ Early M.B.A. students responded similarly to investors on only one (the reliability/credibility composite measure) of the five integration measures. In contrast, select M.B.A. students responded similarly on all five integration measures. These results suggest that once information is acquired, select M.B.A. students appear to integrate the information similarly to investors in tasks that are relatively high in integrative complexity. Early M.B.A. students do not.²⁰

In the next section, we sort early M.B.A. students based on demographic characteristics to explore whether subsets of these individuals serve as good proxies for nonprofessional investors on tasks that are relatively high in integrative complexity, or tasks that are relatively low in integrative complexity and ask participants to make investment decisions.

V. EXPLORATORY ANALYSES

Examining Subsamples of Early M.B.A. Students

As discussed in Section II, Bonner and Lewis (1990) and Libby and Luft (1993) suggest that effort, experience, and knowledge differences might account for the integration differences we observe between early M.B.A. students and nonprofessional investors in experiments 1 and 2. To explore this possibility, we examine whether sorting early M.B.A. students on variables that proxy for effort, experience, and knowledge results in subsamples of students who are good proxies for nonprofessional investors performing tasks that are relatively low and relatively high in integrative complexity. In Panel A (experiment 1) and Panel B (experiment 2) of Table 7 we provide descriptive statistics for all three participant groups, but focus our analysis on early M.B.A. students since our previous results suggest that select M.B.A. students are already good proxies for nonprofessional investors regardless of a task's level of integrative complexity.

Our proxy for effort is the time participants took to complete the materials. Libby and Luft (1993, 433) propose that effort determines the degree to which available knowledge and abilities are brought to bear on a task. Descriptive statistics in Panel A and Panel B of Table 7 reveal that early M.B.A. students spent less time completing the experimental materials in both experiments. The experience variables we examine are investing experience, financial statement analysis experience, and work experience. As shown in Panels A and B of Table 7, early M.B.A. students have less investing experience, financial statement analysis experience, and work experience than investors. We consider the number of accounting and finance classes that early M.B.A. students have taken as well as their scores

¹⁹ We modeled our task after the task used in Hodge et al. (2004). Their task was partially designed to test whether search-facilitating technology facilitates information acquisition. With this purpose in mind, they designed their task to make acquisition challenging. The difficulty of the acquisition task is reflected in the sample sizes we report in Table 6; only 33 early M.B.A. students passed all of the acquisition tests (27 percent), only 20 investors passed all of the acquisition tests (34 percent), and only 13 select M.B.A. students passed all of the acquisition tests (42 percent).

²⁰ Our experiment 2 integration results are inferentially identical using nonparametric tests.

TABLE 6
Experiment 2 Integration Variables for Participants Who Passed All Acquisition Tests

Panel A: Descriptive Statistics [mean (standard deviation)]

Dependent Variable	Early M.B.A. ^a n ≈ 33	Investor n ≈ 20	Select M.B.A. n ≈ 13
1: Reliability/Credibility Composite			
	Firm D Firm R	5.4 (2.7) 8.4 (1.2)	6.1 (2.4) 8.3 (1.0)
2: Financial Performance			
	Firm D Firm R	5.1 (2.5) 6.8 (1.8)	4.4 (2.5) 7.8 (1.9)
3: Percent who put Firm D and Firm R on equal footing		70%	77%
4: If you had to invest all \$10,000 in one firm, which firm would you invest in?			
	Firm D Firm R	25% 75%	23% 77%
5: If you could invest in both firms, what percentage would you invest in each?			
	Firm D Firm R	30% (33%) 70% (33%)	27% (28%) 73% (28%)

Panel B: Paired Comparisons by Participant Group

Variable	Investor	Select M.B.A.
1	t = 4.99, p < 0.01	t = 3.21, p < 0.01
2	t = 2.75, p = 0.01	t = 3.60, p < 0.01

Panel C: Planned Comparisons by Participant Group

Variable	Select vs. Investor	Early vs. Select
3	$\chi^2 = 0.19$, p = 0.66	$\chi^2 = 3.72$, p = 0.05
4	$\chi^2 = 0.01$, p = 0.90	$\chi^2 = 3.72$, p = 0.05
5	t = 0.27, p = 0.79	t = 2.31, p = 0.03

^a See notes to Table 5.

TABLE 7
Experiment 1 and 2 Effort, Experience, and Knowledge Variables

Panel A: Effort, Experience, and Knowledge Variables

Dependent Variables

- 1: Minutes spent analyzing the materials and answering the first questionnaire
- 2: Have you ever bought or sold an individual company's common stock or debt securities (not through a mutual or pension fund)?
- 3: How many years have you been buying/selling individual equity or debt investments?
- 4: How many times have you evaluated a company's performance by analyzing its financial statements?
- 5: How many accounting and finance courses have you taken?
- 6: How many years of full-time work experience do you have?^a
- 7: Financial literacy quiz (percent correct)^a

Panel B: Experiment 1 Descriptive Statistics by Participant Group

Variable	Early M.B.A. ^a n = 82				Investor n = 37				Select M.B.A. n = 42			
	Mean	Median	Std. Dev.	Range	Mean	Median	Std. Dev.	Range	Mean	Median	Std. Dev.	Range
1: (minutes)	13	13	5	5-31	17 minutes	15	7	5-32	14 minutes	14	6	5-30
2: "Yes"	52%				100%				69%			
2: "No"	48%				0%				31%			
3: (years)	2.9	2.0	4.1	0-25	13.9	10.0	13.0	1-50	3.9	3.0	4.1	0-15
4: "First time"	17%				3%				7%			
4: "1-5 times"	48%				20%				27%			
4: "6+ times"	35%				77%				66%			
5: "Accounting"	1.8	1.0	1.3	0-8	1.9	1.0	2.3	0-10	3.5	3.0	2.7	1-15
5: "Finance"	1.0	0.0	1.9	0-6	1.6	0.0	2.7	0-10	2.9	3.0	1.5	1-7
6: (years)	5.2	4.0	2.9	0-12	27.6	30.0	12.8	4-45	5.9	6.0	2.8	0-14
7: (% correct)	70%	67%	12%	47-93%	51%	60%	19%	0-80	71%	73%	16%	40-93

(continued on next page)

TABLE 7 (Continued)

Panel C: Experiment 2 Descriptive Statistics by Participant Group

Variable	Early M.B.A. ^a n = 124				Investor n = 58				Select M.B.A. n = 31			
	Mean	Median	Std. Dev.	Range	Mean	Median	Std. Dev.	Range	Mean	Median	Std. Dev.	Range
1: (minutes)	31	26	18	10-155	39 minutes	40	17	5-138	32 minutes	22	30	6-143
2: "Yes"	52%				100%				68%			
2: "No"	48%				0%				32%			
3: (years)	2.6	0.3	3.9	0-20	11.6	10.0	10.4	1-50	2.0	0.0	2.4	0-7
4: "First time"	16%				7%				0%			
4: "1-5 times"	62%				33%				42%			
4: "6+ times"	22%				60%				58%			
5: "Accounting"	1.6	1.0	2.0	0-14	1.9	0.5	3.2	0-15	3.6	3.0	2.6	1-12
5: "Finance"	0.6	0.0	0.9	0-5	1.3	0.0	2.6	0-10	3.5	3.0	2.1	1-10
6: (years)	5.8	5.2	3.3	1-20	27.8	30.0	12.3	5-45	4.4	4.0	2.3	0-10
7: (% correct)	71%	73%	11%	40-93	51%	53%	16%	20-87	79%	80%	12%	47-93

^a Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.

^b In Experiment 2, we did not ask participants for years of work experience. Although this data is relatively easy to collect from M.B.A. students *ex post*, it is more difficult to collect from investors. Thus, we only have work experience data for the 32 investors who completed both experiments 1 and 2.

^c Participants completed a 15-question financial literacy quiz. We report the average percentage of questions answered correctly by each participant group.

on a financial literacy quiz as proxies for general financial reporting knowledge.²¹ Descriptive statistics reported in Panel A and B of Table 7 show that early M.B.A. students have taken approximately the same number of accounting/finance classes as nonprofessional investors, but scored higher on the financial literacy quiz.

Our exploratory analysis consists of splitting each of the above variables at the median and rerunning our integration tests in experiments 1 and 2 using only those early M.B.A. students who spent more time on the materials, have greater amounts of investing, financial statement analysis or work experience, have taken more accounting/finance classes, or performed worse on the financial literacy quiz. Results from this analysis (not tabled) fail to identify a subsample of early M.B.A. participants who integrate information similarly to nonprofessional investors across tasks that are relatively low (experiment 1) and relatively high (experiment 2) in integrative complexity.²²

VI. DISCUSSION AND CONCLUSION

This paper investigates the assumption underlying much of the experimental research in financial accounting that graduate business students are a good proxy for nonprofessional investors. We investigate this assumption by using two experimental settings; one that is relatively low in integrative complexity and one that is relatively high in integrative complexity. Both levels of integrative complexity are common in prior studies in the accounting literature. We test for differences between M.B.A. students and nonprofessional investors in the components of integrative complexity, information acquisition and information integration, to determine if using M.B.A. students as proxies for investors informs us about the likely behavior of nonprofessional investors.

Our results reveal that M.B.A. students who have completed the first year of an M.B.A. program and have elected to take a financial statement analysis course (select M.B.A. students) are good proxies for nonprofessional investors in tasks that are relatively low in integrative complexity. Though less definitive, the majority of our tests also suggest that select M.B.A. students are a good proxy for nonprofessional investors in tasks that are relatively high in integrative complexity. In tasks that are relatively low in integrative complexity, M.B.A. students who are midway through a core financial accounting course in the first year of the M.B.A. program (early M.B.A. students) acquire and integrate information similarly to nonprofessional investors except when they are asked to make an investment decision. For tasks that are relatively high in integrative complexity, early M.B.A. students acquire information similarly to nonprofessional investors, but they do not appear to integrate the information in a similar manner. Thus, for tasks that are relatively high in integrative complexity, we recommend that researchers recruit select M.B.A. students when actual nonprofessional investors are not available.

Like all research, our study is subject to several limitations. First, we did not test for knowledge differences in specific subtopics of financial accounting or in other areas that might be important in making good investment decisions (e.g., industry-specific knowledge or forecasting knowledge). Given that we observe differences between M.B.A. students and

²¹ General financial reporting knowledge is a broad concept encompassing many subconstructs. Thus, similar to Bonner and Walker (1994) and Shankar and Tan (2006), we do not report an overall reliability measure for our literacy quiz. An alternate approach would be to compute a reliability measure for each subconstruct. Given length and time constraints, however, we chose to include only a few questions pertaining to any individual subconstruct and are therefore unable to compute subconstruct reliability measures.

²² We recognize that our median-split exploratory analysis has limitations. We conduct this analysis because of the considerable overlap in the distributions of early M.B.A. students' and investors' effort, experience, and knowledge measures (see Panels B and C of Table 7).

nonprofessional investors on some of our variables, future research could further explore the various dimensions that differ between these groups. Our exploratory analysis was unable to identify key effort, knowledge, or experience metrics, that when sorted on, allow early M.B.A. students to perform similarly to investors.

Second, our analysis incorporated two financial reporting tasks: one that is relatively low in integrative complexity and one that is relatively high in integrative complexity. We expect our settings to be representative of other financial reporting differences between firms. The extent to which they are not limits the generalizability of our findings. Third, our nonprofessional investors may not represent the entire cross-section of nonprofessional investors. We believe, however, that our nonprofessional investors meet the FASB's criteria that nonprofessional investors "have a reasonable understanding of business and economic activities and are willing to study the information with reasonable diligence" (FASB 1978). Notwithstanding these limitations, our study provides evidence to researchers, regulators, and standard setters that using M.B.A. students as a proxy for nonprofessional investors is a valid methodological choice, as long as researchers give careful consideration to aligning a task's level of integrative complexity with the appropriate level of M.B.A. student.

REFERENCES

- Bloomfield, R., and R. Libby. 1996. Market reactions to differentially available information in the laboratory. *Journal of Accounting Research* 34 (Autumn): 183–207.
- , ———, and M. Nelson. 1999. Confidence and the welfare of less-informed investors. *Accounting, Organizations and Society* 24 (8): 623–647.
- , and T. Wilks. 2000. Disclosure effects in the laboratory: Liquidity, depth, and the cost of capital. *The Accounting Review* 75 (January): 13–42.
- , R. Libby, and M. Nelson. 2003. Do investors over-rely on old elements of the earnings time series? *Contemporary Accounting Research* 20 (Spring): 1–31.
- Bonner, S., and B. Lewis. 1990. Determinants of auditor expertise. *Journal of Accounting Research* 28 (Supplement): 1–20.
- . 1994. A model of the effects of audit task complexity. *Accounting, Organizations and Society* 19 (3): 213–234.
- , and P. Walker. 1994. The effects of instruction and experience on the acquisition of auditing knowledge. *The Accounting Review* 69 (January): 157–178.
- BusinessWeek. 2004. BusinessWeek business school rankings & profiles. Available at: <http://www.businessweek.com/bschools/04/index.html>.
- Elliott, W. 2006. Are investors influenced by pro forma emphasis and reconciliations in earnings announcements? *The Accounting Review* 81 (January): 113–133.
- Financial Accounting Standards Board (FASB). 1978. *Objectives of Financial Reporting by Business Enterprises*. Statement of Financial Accounting Concepts No. 1. Stamford, CT: FASB.
- Frederickson, J., and J. Miller. 2004. The effects of pro forma earnings disclosures on analysts' and nonprofessional investors' equity valuation judgments. *The Accounting Review* 79 (July): 667–686.
- Hirst, D., L. Koonce, and P. Simko. 1995. Investor reactions to financial analysts' research reports. *Journal of Accounting Research* 33 (Autumn): 335–351.
- , ———, and J. Miller. 1999. The joint effect of management's prior forecast accuracy and the form of its financial forecasts on investor judgment. *Journal of Accounting Research* 37 (Supplement): 101–124.
- , K. Jackson, and L. Koonce. 2003. Improving financial reports by revealing the accuracy of prior estimates. *Contemporary Accounting Research* 20 (Spring): 165–193.
- Hodge, F. 2001. Hyperlinking unaudited information to audited financial statements: Effects on investor judgments. *The Accounting Review* 76 (October): 675–691.

- . 2003. Investors' perceptions of earnings quality, auditor independence, and the usefulness of audited financial information. *Accounting Horizons* (Supplement): 37–48.
- , J. Kennedy, and L. Maines. 2004. Does search-facilitating technology improve the transparency of financial reporting? *The Accounting Review* 79 (July): 687–703.
- Hogarth, R. 1980. *Judgement and Choice*. Chichester, U.K.: John Wiley & Sons.
- Kennedy, J., T. Mitchell, and S. Sefcik. 1998. Disclosure of contingent environmental liabilities: Some unintended consequences. *Journal of Accounting Research* (Autumn): 257–277.
- Krische, S. 2005. Investors' evaluations of strategic prior-period benchmark disclosures in earnings announcements. *The Accounting Review* 80 (January): 243–268.
- Lerner, J., and P. Tetlock. 1999. Accounting for the effects of accountability. *Psychological Bulletin* 125 (2): 255–275.
- Libby, R., and J. Luft. 1993. Determinants of judgment performance in accounting settings: Ability, knowledge, motivation and environment. *Accounting, Organizations and Society* 18 (5): 425–450.
- . 1995. The role of knowledge and memory in audit judgment. In *Judgment and Decision Making Research in Accounting and Auditing*, edited by R. H. Ashton, and A. H. Ashton, 176–206. New York, NY: Cambridge University Press.
- , R. Bloomfield, and M. W. Nelson. 2002. Experimental research in financial accounting. *Accounting, Organizations and Society* 27 (8): 775–810.
- Lipe, M. 1998. Individual investors' risk judgments and investment decisions: The impact of accounting and market data. *Accounting, Organizations and Society* 23 (7): 625–640.
- Luft, J., and M. Shields. 2001. Why does fixation persist? Experimental evidence on the judgment performance effects of expensing intangibles. *The Accounting Review* 76 (October): 561–587.
- Maines, L., and J. Hand. 1996. Individuals' perceptions and misperceptions of time series properties of quarterly earnings. *The Accounting Review* 71 (July): 317–336.
- , and L. McDaniel. 2000. Effects of comprehensive income characteristics on nonprofessional investors' judgments: The role of financial statement presentation format. *The Accounting Review* 75 (April): 179–207.
- Mercer, M. 2005. The fleeting effects of disclosure forthcomingness on management's reporting credibility. *The Accounting Review* (April): 723–744.
- National Association of Investors Corporation (NAIC). 2003. *NAIC Fact Sheet*. Madison Heights, MI: NAIC. Available at: <http://www.betterinvesting.org/about/fact.html>.
- Nelson, M., S. Krische, and R. Bloomfield. 2003. Confidence and investors' reliance on disciplined trading strategies. *Journal of Accounting Research* 41 (June): 503–523.
- O'Hara, T., and K. Janke. 1998. *Starting and Running a Profitable Investment Club*. New York, NY: Random House.
- Schroder, H., M. Driver, and S. Streufert. 1967. *Human Information Processing*. New York, NY: Holt, Rinehart & Winston.
- Securities Industry Association (SIA). 2002. *Equity Ownership In America*. New York, NY: SIA.
- Shankar, P., and H. Tan. 2006. Determinants of audit preparers' workpaper justifications. *The Accounting Review* (March): 473–475.
- Streufert, S. 1970. Complexity and complex decision making: Convergences between differentiation and integration approaches to the prediction of task performance. *Journal of Experimental Social Psychology* 6: 494–509.
- Streufert, S., and S. Streufert. 1978. *Behavior in the Complex Environment*. Washington, D.C.: Winston.
- Tetlock, P. 1983. Accountability and complexity of thought. *Journal of Personality and Social Psychology* 45: 74–83.
- U.S. News & World Report. 2004. *America's Best Graduate Schools*. Washington, D.C.: U.S. News.

The Accrual Anomaly: International Evidence

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ABSTRACT: We consider stock markets in 20 countries to investigate whether the accrual anomaly (Sloan 1996), characterized by U.S. stock prices overweighting the role of accrual persistence, is a local manifestation of a global phenomenon. We explore whether the occurrence of the anomaly is related to country differences in accounting and institutional structures, and examine alternative explanations for its occurrence. We find stock prices overweight accruals in general, with accruals overweighting occurring in countries with a common law relative to a code law tradition. Using firm-level data on a country-by-country basis, we document the occurrence of the anomaly in four countries, Australia, Canada, the U.K., and the U.S., and also in a sample of American Depositary Receipts (ADRs) of firms domiciled in countries where we do not detect the anomaly. Using country-level data, we confirm the anomaly is more likely to occur in countries having a common law tradition, and also in countries allowing extensive use of accrual accounting and having a lower concentration of share ownership. Additional analyses reveal that earnings management and barriers to arbitrage best explain the anomaly.

Keywords: *accrual anomaly; operating cash flows; total and abnormal accruals; international accounting.*

Data Availability: *Data used in this study are available from public sources identified in the paper.*

I. INTRODUCTION

Sloan (1996) demonstrates that in the U.S. capital markets, a trading strategy based on a long (short) position in stocks of firms in the lowest (highest) decile of accruals generates significant abnormal security returns in the following year. Sloan's (1996)

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results are anomalous to capital market efficiency, and a Mishkin (1983) test indicates that investors implicitly assign a higher weight than warranted to accruals in pricing stocks. A number of studies document that the accrual anomaly is robust across various samples of U.S. firms (e.g., Collins and Hribar 2000; Bradshaw et al. 2001; Xie 2001; Zach 2003).

The purpose of our research is threefold: we investigate (1) whether the accrual anomaly generalizes to other countries; (2) whether the occurrence of the accrual anomaly is associated with country-level accounting and institutional structures; and (3) various alternative explanations of the accrual anomaly that have been proposed in the literature.

Regarding our first research objective, we initially pool firm-level data across the 20 countries we consider and conduct Mishkin (1983) tests to document the occurrence of accruals overweighting outside of the U.S. in general, and by a country's legal tradition: common law versus code law (e.g., Ball et al. 2000). We then analyze each country separately. With regard to our second objective, we use country-level data to test a set of conjectures relating the occurrence of the accrual anomaly to cross-country differences in accounting and institutional structures (e.g., Bushman and Smith 2001). More specifically, we base our predictions on three categories of country-level characteristics: (1) legal tradition and extent of constraints on insider trading; (2) extent of accrual accounting permitted and strength of shareholder protections to mitigate earnings management; and (3) characteristics of equity markets, including their importance as a source of capital and the concentration of share ownership. Finally, we use firm-level data on a country-by-country basis and perform a series of abnormal returns tests, first to confirm that accruals overweighting can be exploited through trading—thereby further addressing our first objective—and second to tackle our objective of investigating alternative explanations for the accrual anomaly. In this regard, we examine four alternative explanations for the accrual anomaly that have been proposed in the literature: that it is (1) due to earnings management (Xie 2001); (2) due to barriers to arbitrage (Mashruwala et al. 2006); (3) due to less reliably measured accrual components (Richardson et al. 2005); and (4) a manifestation of the value-glamour anomaly (Desai et al. 2004).

One motivation for our research is similar to that for Fama and French's (1998) study that documents out-of-U.S.-sample evidence about the occurrence and generalizability of the value versus glamour anomaly in finance and also provides evidence on alternative explanations of that anomaly. Anomalies, by their very nature, represent a challenge to existing theory. Hence, investigating the incidence, generalizability, and reason(s) for the accrual anomaly worldwide should provide additional insight into the nature of this challenge to capital market efficiency.

Studies that have examined the role and impact of accounting and institutional structures in diverse economies also motivate our research. Bushman and Smith (2001) argue that cross-country designs present a natural laboratory for testing the relation between accounting regimes and the properties of underlying capital markets and institutions, and one area of research they suggest is to examine the extent to which cross-country differences in institutional structures affect the relation between earnings and stock returns. Bushman and Piotroski (2004) explore how different countries' institutional structures affect the accounting numbers that firms domiciled in those countries report, and they investigate interesting patterns across countries in the returns-earnings relation. Holthausen (2003) calls for the increased use of quantitative measures in the analysis of differences in accounting and institutional structures in cross-country research.

Our research is important for several reasons. First, the accrual anomaly is a direct challenge to capital market efficiency with respect to accounting information. Hence, evidence on the pervasiveness of the anomaly worldwide contributes to the assessment of

extant capital market theory. Second, we test alternative explanations for the accrual anomaly that appear in the literature, and provide evidence on the validity of each in a global setting. Third, by examining the links between the occurrence of the accrual anomaly and cross-country differences in institutional structures and accounting regimes, we gain insight into the informational, corporate governance, and capital market factors most associated with the accrual anomaly occurring, and thus add to our understanding of why the anomaly occurs in the first place. Moreover, identifying the institutional circumstances under which the accrual anomaly is likely to occur is potentially useful in setting and regulating financial accounting and reporting standards. For example, more transparent and timely reporting of accruals might be considered to mitigate the potential for market mispricing of accounting information.

Our analysis examines 20 countries and spans the period 1994–2002. With respect to the question of whether the accrual anomaly, as represented by stock prices overweighting accruals, generalizes to other countries, the results indicate that the anomaly occurs worldwide in pooled samples, but is concentrated in countries having a common law legal tradition, and specifically occurs in only four of the 20 countries we consider: Australia, Canada, the United Kingdom, and the U.S. Regarding a link between the occurrence of the accrual anomaly and country-level institutional structures, we confirm that the anomaly is more likely to occur where a common law legal tradition exists, and also where more extensive use of accrual accounting is permitted, where there is a lower the concentration of share ownership, and possibly where there are weaker outside shareholder rights.

In addition, we document the occurrence of the accrual anomaly in the American Depository Receipt (ADR) market for a sample of firms domiciled in countries where we do not document the occurrence of the accrual anomaly. We note that in addition to having a common law tradition, the U.S. permits the most extensive use of accrual accounting and has the most disperse ownership of shares of the countries represented in our sample. Finally, our investigation of alternative explanations for the accrual anomaly reveals the strongest evidence in favor of the earnings management and limits to arbitrage explanations. That is, the results suggest that the anomaly is due to the use of accruals to manage earnings, and it persists because of an absence of close substitutes for mispriced stocks, which imposes a barrier to arbitrage.

We organize the remainder of the paper as follows. In the next section we state our basic research hypothesis regarding the generalizability of the accrual anomaly, discuss the sample and empirical design, and report the results of pooled and country-specific Mishkin tests of the hypothesis. In Section III we develop predictions and implement our empirical analysis of the relation between cross-country differences in accounting and institutional structures and the occurrence of the accrual anomaly. Section IV presents results of abnormal returns tests, first of the basic research question, and then of additional hypotheses that reflect the alternative explanations for the accrual anomaly that have been proposed. Section V reports ADR results, and we summarize and conclude in Section VI.

II. BASIC HYPOTHESIS: GENERALIZABILITY OF THE ACCRUAL ANOMALY TO OTHER COUNTRIES

In this section, we state our hypothesis on the accrual anomaly's pervasiveness worldwide, describe the sample and empirical design used to test the hypothesis, and present the results.

Basic Research Hypothesis

Our basic hypothesis is whether the overweighting of accruals in securities pricing that Sloan (1996) (hereafter, Sloan) and others have documented generalizes to other countries. Given the variations across countries in business practices, legal, institutional, and capital market structures, accounting regimes, etc., it is not obvious that the accrual anomaly, which has been documented in the context of the U.S. accounting and capital market environment, will also occur in other countries, or if it does, that it will occur in all other countries. Our goal is to determine whether the accrual anomaly is an artifact of U.S. financial reporting and institutional structures, or is a more pervasive phenomenon. The hypothesis (in alternative form) is as follows:

H1: The accrual anomaly, i.e., an overweighting of accruals by U.S. investors in setting prices relative to the weight implied by a forecast of earnings, also occurs in other countries.

We test H1 in several ways. First, we pool firm-level data and conduct Mishkin (1983) tests (hereafter, Mishkin tests) on a sample that spans all countries (excluding the U.S.) followed by tests on the same sample classified by legal tradition (i.e., common law or code law). Second, we use firm-level data and separately examine each of the 20 countries (including the U.S.) in our sample. Third, we also perform abnormal returns tests using firm-level data on a country-by-country basis. This last test indicates whether abnormal returns can be earned by pursuing a trading strategy based on accruals, while Mishkin tests confirm whether the abnormal returns are attributable to the market's overweighting of accruals. We focus on the Mishkin tests in this section and discuss the abnormal returns tests in Section IV.¹

Sample and Data

We conduct the empirical analysis using all firms with available data over 1994–2002 on the Global Vantage Industrial/Commercial (GVIC) and Global Vantage Issues (GVI) files for 20 countries: Australia, Canada, Denmark, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, The Netherlands, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, the United Kingdom, and the United States.² We focus on these countries because the greatest number of usable observations for our empirical tests is available for these countries, and they cover a substantial proportion of the world's total stock market capitalization and reflect different reporting, regulatory, and corporate governance philosophies. Such variation permits us to examine the sensitivity of the accrual anomaly to a broad range of institutional structures.

Following Ball et al. (2000), we define accounting income as net income before extraordinary items (GVIC data 32); and operating cash flows as net income before extraordinary items (GVIC data 32) plus depreciation (GVIC data 11) minus the change in noncash current assets (GVIC data 75 minus GVIC data 60) plus the change in current liabilities

¹ A recent working paper by LaFond (2005) addresses the same basic research question we address. Using the Datastream/Worldscope database, LaFond (2005) conducts abnormal returns tests but not Mishkin tests, and thus cannot definitively distinguish between accrual overweighting and operating cash flow underweighting. LaFond (2005, Table 5) provides a summary of results and country characteristics.

² Even though Global Vantage covers the period 1993 to 2004, we lose the years 1993, 2003, and 2004 because (1) we require two years of data to estimate accruals using the balance sheet method, (2) we require one-period-ahead stock returns for the empirical analysis, and (3) fiscal years ending in 2004 have incomplete data. Ball et al. (2000) and Bushman and Piotroski (2004) are examples of studies that also use Global Vantage.

other than current portion of long-term debt (GVIC data 104 minus data 94). We scale income, operating cash flows, and accruals (defined as income minus operating cash flows) by average total assets measured as the average of the beginning and end-of-fiscal-year book value of total assets (GVIC data 89). Stock return is the annual holding period return, including dividends, computed from the GVI dataset. Abnormal return (AR) is stock return subtracted by the appropriate country index for the same time-period compiled by the investment bank Morgan Stanley (<http://www.msci.com>).³ We accumulate returns differently for various countries based on the timing of availability of financial statements (see Table 4 for the filing deadline for each country). In particular, we identify the reporting requirement for each of the countries in our sample and assume that firms file their financial statements on a timely basis.

We eliminate financial firms, such as banks and insurance companies (SIC codes 6000–6999), because of peculiarities in the accruals for such firms. We obtain all observations for the countries and time period we examine on the Global Vantage databases for which there are sufficient data to compute all variables, resulting in a sample of 62,027 firm-years. Across the 19 foreign countries samples range from 504 observations for Denmark to 13,822 observations for Japan (see Table 1). There are 19,039 firm-years for the U.S.

Descriptive Statistics

We begin with a description of the sample by country in terms of several key financial variables: firm size (*SIZE*), book-to-market (*BM*) ratio, earnings-to-price (*EP*) ratio, return on assets (defined as net income before extraordinary items scaled by average total assets, and denoted *NI*), operating cash flows scaled by average total assets (*OCF*), accruals scaled by average total assets (*ACC*), and annual stock returns including dividends (*Return*). Table 1 shows median values for each variable by country over the sample period.

The data suggest the following. On average, the largest firms are from Taiwan, the U.S., and Spain, and the smallest are from Thailand, Indonesia, Malaysia, Singapore, and Sweden. Firm-years in the U.S., The Netherlands, and the U.K. reflect relatively low *BM*, while firm-years for Hong Kong and Thailand reflect high *BM* values. The highest *EP* ratios are for firm-years in India, and the lowest are for Japan and Sweden. Return on assets is highest in India, The Netherlands, and the U.K., and lowest in Japan. Firm-years for The Netherlands reflect the highest *OCFs*, while the lowest *OCFs* are from Hong Kong, Indonesia, and Japan. Median *ACCs* are negative in all countries, with Hong Kong, India, and Malaysia having the least negative accruals as a percentage of average total assets and Germany and Thailand the most negative. Median stock returns are negative for the firm-years for 14 of the 20 countries, with the most negative returns in Sweden and the most positive in Australia and Spain.

Table 2 presents correlations between earnings, accruals, and operating cash flows. There are reliably negative associations between *ACC* and *OCF* in all 20 countries; the most negative are for Italy and Germany and the least negative are for Sweden and the U.S. *NI* and *OCF* are reliably positively correlated in all of the countries, with Sweden and Hong Kong having the highest correlations and Germany the smallest. *NI* and *ACC* are reliably positively related everywhere except Italy; Indonesia, Taiwan, and the U.S. have the highest correlations.

³ Size adjustment poses a challenge in a number of countries where the number of firms in a size decile for a given year can be quite low. Hence, we do not compute size-adjusted returns. Instead we use market-adjusted returns and introduce size as an independent variable in our abnormal returns tests.

TABLE 1
Medians of Various Firm-Year Characteristics across Countries

Country	n	SIZE (U.S. \$ mill)	BM	EP	NI	OCF	ACC	Return
Common Law Countries:								
Australia	1883	122.27	0.58	0.05	0.04	0.07	-0.04	0.03
Canada	2816	196.75	0.50	0.03	0.03	0.07	-0.04	0.01
Hong Kong	553	111.83	1.25	0.06	0.03	0.04	-0.02	-0.06
India	1245	89.54	0.91	0.08	0.06	0.08	-0.02	-0.07
Malaysia	2215	50.75	0.74	0.04	0.03	0.05	-0.02	-0.05
Singapore	1471	62.97	0.83	0.04	0.02	0.05	-0.03	-0.08
Thailand	1369	21.89	1.07	0.07	0.04	0.08	-0.05	0.01
United Kingdom	6482	139.30	0.47	0.05	0.06	0.09	-0.04	-0.01
United States	19039	369.51	0.41	0.04	0.04	0.07	-0.04	0.02
Code Law Countries:								
Denmark	504	88.06	0.80	0.07	0.04	0.07	-0.04	-0.08
France	2782	109.96	0.54	0.04	0.03	0.07	-0.04	-0.02
Germany	2483	142.84	0.50	0.04	0.03	0.07	-0.05	-0.03
Indonesia	839	32.37	0.65	0.04	0.02	0.04	-0.03	-0.14
Italy	785	232.81	0.60	0.04	0.03	0.06	-0.03	-0.08
Japan	13822	122.73	0.94	0.02	0.01	0.04	-0.03	-0.12
The Netherlands	842	208.58	0.43	0.06	0.06	0.10	-0.04	-0.08
Spain	678	338.17	0.59	0.06	0.04	0.09	-0.04	0.03
Sweden	777	71.77	0.52	0.02	0.03	0.05	-0.03	-0.16
Switzerland	815	227.89	0.66	0.06	0.04	0.08	-0.04	0.00
Taiwan	627	413.86	0.61	0.03	0.03	0.06	-0.03	-0.15

Sample consists of 62,027 firm-year observations over the period 1994–2002.

SIZE is the market value of common equity translated into U.S. dollars on the date of the filing deadline for the respective countries (see Table 4). Firm size is denominated here in U.S. dollars solely for the purpose of descriptive statistics; *B/M* is the ratio of the book-to-market ratio; *EP* is earnings-to-price ratio; *NI* is net income before extraordinary items (GVIC data 32) scaled by average total assets measured as the average of the beginning and end of the fiscal year total assets (GVIC data 89); *OCF* is operating cash flows scaled by average total assets. Operating cash flows is determined as net income before extraordinary items (GVIC data 32) plus Depreciation (GVIC data 11) minus the change in Current assets (GVIC data 75 minus data 60) and plus the change in Current liabilities (GVIC data 104 minus data 94); *ACC* is accruals scaled by average total assets determined by *NI* minus *OCF*; *Return* is the annual holding period return, including dividends. Common law (code law) distinction is based on a country's legal tradition (La Porta et al. 1998).

Empirical Design

Sloan introduced the Mishkin framework to the accounting literature, and it has since been used in a number of studies that test for capital market efficiency. We infer over-weighting of accruals if market participants attribute a higher valuation coefficient to accruals than the weight implied in the association between accruals and future earnings.

As in prior research, we jointly estimate a forecasting specification for future earnings and the rational expectations pricing specification (we suppress firm-specific subscripts):

$$NI_{t+1} = \gamma_0 + \gamma_1 ACC_t + \gamma_2 OCF_t + \varepsilon_{t+1} \quad (1)$$

$$AR_{t+1} = \beta_0 + \beta_1 (NI_{t+1} - \gamma_0^* - \gamma_1^* ACC_t - \gamma_2^* OCF_t) + v_{t+1} \quad (2)$$

TABLE 2
Correlation Statistics between Earnings and its Components

Country	(ACC, OCF)	(NI, OCF)	(NI, ACC)
Common Law Countries:			
Australia	-0.55**	0.67**	0.08**
Canada	-0.45**	0.69**	0.18**
Hong Kong	-0.49**	0.71**	0.11**
India	-0.66**	0.52**	0.20**
Malaysia	-0.57**	0.53**	0.27**
Singapore	-0.64**	0.49**	0.20**
Thailand	-0.63**	0.59**	0.13**
United Kingdom	-0.51**	0.67**	0.14**
Thailand	-0.63**	0.59**	0.13**
Code Law Countries:			
Denmark	-0.68**	0.53**	0.12**
France	-0.65**	0.49**	0.20**
Germany	-0.75**	0.38**	0.18**
Indonesia	-0.44**	0.64**	0.28**
Italy	-0.78*	0.52**	0.01
Japan	-0.70**	0.50**	0.13**
The Netherlands	-0.61**	0.49**	0.23**
Spain	-0.68**	0.56**	0.09*
Sweden	-0.31**	0.74**	0.27**
Switzerland	-0.57**	0.53**	0.25**
Taiwan	-0.50**	0.59**	0.28**
United States	-0.36**	0.69**	0.28**

** , * , ^ Represents statistical significance at 1 percent, 5 percent, and 10 percent levels, respectively, two-tailed. Sample consists of 62,027 firm-year observations over the period 1994–2002.

NI is net income before extraordinary items (GVIC data 32) scaled by average total assets measured as the average of the beginning and end of the fiscal year total assets (GVIC data 89); OCF is operating cash flows scaled by average total assets. Operating cash flows is determined as net income before extraordinary items (GVIC data 32) plus Depreciation (GVIC data 11) minus the change in Current assets (GVIC data 75 minus data 60) and plus the change in Current liabilities (GVIC data 104 minus data 94); ACC is accruals scaled by average total assets determined by NI minus OCF.

where all variables have previously been defined. We winsorize extreme observations of the regression variables at the 5th and 95th percentile values.⁴

Market efficiency with respect to accruals imposes the constraint that γ_1^* from the returns Equation (2) is not different than γ_1 from the forecasting Equation (1). This non-linear constraint requires that the stock market rationally anticipate the implications of current period accruals for future earnings. If the anomaly generalizes to other countries, then $\gamma_1 < \gamma_1^*$, implying the market assesses a higher contribution of current period accruals to future earnings than is warranted by the underlying cross-sectional association of current period accruals and future earnings.

⁴ We winsorize observations in an attempt to prevent contamination of our inferences by measurement error due to the presence of extreme values. Several prior papers that have used the Global Vantage database deleted extreme observations (e.g., Alford et al. 1993; Ali and Hwang 2000; Ball et al. 2000; Land and Lang 2003). In unreported results of our country-specific analyses, we use decile ranks instead of actual values for all variables, except returns. The rank procedure has the advantage of not winsorizing extreme observations. When we do the analyses using ranks and non-winsorized observations, the inferences are similar to those reported.

We estimate Equations (1) and (2) using iterative weighted nonlinear least squares (Mishkin 1983). The test statistic is a likelihood ratio distributed asymptotically Chi-square (q):

$$2 \times n \times \ln(SSR^c/SSR^u) \quad (3)$$

where:

q = the number of constraints imposed by market efficiency;

n = the number of observations in each equation;

SSR^c = the sum of squared residuals from the constrained weighted system; and

SSR^u = the sum of squared residuals from the unconstrained weighted system.

Results of Mishkin Tests of H1

Table 3, Panel A reports the results of estimating Equations (1) and (2) using firm-level data pooled across the 19 countries other than the U.S.⁵ Across all these countries, we find that stock prices overweight accruals persistence (i.e., $\gamma_1 = 0.583 < 0.743 = \gamma_1^*$, $F = 17.44$, two-tailed p -value < 0.01). We also find that operating cash flows are underweighted in pricing; $\gamma_2 = 0.639 > 0.566 = \gamma_2^*$ ($F = 8.72$).

To gain initial insight on the pervasiveness of these overall results, we re-run the Mishkin test after decomposing the pooled sample into two groups based on a country's legal tradition: common law or code law. Ball et al. (2000) and Bushman and Piotroski (2004) view legal tradition as the main proxy for cross-country differences in institutional structures. As Ball et al. (2000) discuss, a common law system reflects a "shareholder model" of corporate governance, whereas a code law system characterizes a "stakeholder model" of corporate governance, and an important difference between these two is how the information asymmetry between corporate insiders and other stakeholders gets resolved. Under a common law system shareholders elect the governing boards of companies, and most stakeholders interact with firms at greater "arm's length" (i.e., through markets) than under a code law system. In contrast, in code law countries firms' governing boards include agents representing a diverse set of stakeholder interests (e.g., debtholders, employees, suppliers, customers, and shareholders). This implies that in code law countries a wider range of stakeholders has access to companies' inside information than in common law countries, which suggests that a wider range of stakeholders better understands the accrual components of reported earnings. Hence, to the extent that a stakeholder model of corporate governance leads to a more widespread appreciation of the persistence characteristics of accruals, we expect less overweighting of accruals in code law countries and thus a lower probability the accrual anomaly will occur there.

Using La Porta et al.'s (1998) common and code law country designations, which we detail below in Table 4, we find in pooled sample results (Table 3, Panel A) that the accrual anomaly occurs in the group of non-U.S. common law countries ($\gamma_1 = 0.572 < 0.860 = \gamma_1^*$, $F = 23.11$), but not in the group of code law countries ($\gamma_1 = 0.596 \approx 0.561 = \gamma_1^*$, $F = 0.48$). We also find that the pricing of operating cash flows differs across these two groups of firms. For the group of common law countries, there is no evidence that stock prices underweight operating cash flow persistence ($\gamma_2 = 0.637$ and $\gamma_2^* = 0.682$,

⁵ Because the accrual anomaly has been well documented in the U.S., including these firms in the pooled sample will likely cause biased findings. Therefore, we exclude U.S. firms from the pooled analysis.

TABLE 3
Regression Results of Capital Market Weighting of Accrual and Cash Flow Components using the Mishkin (1983) Framework

Panel A: Mishkin Tests of the Components of Earnings—Pooled Samples

$$NI_{t+1} = \gamma_0 + \gamma_1 ACC_t + \gamma_2 OCF_t + \varepsilon_{t+1} \quad (1)$$

$$AR_{t+1} = \beta_0 + \beta_1(NI_{t+1} - \gamma_0^* - \gamma_1^* ACC_t - \gamma_2^* OCF_t) + v_{t+1} \quad (2)$$

Country	n	β_1	γ_1	γ_1^*	γ_2	γ_2^*	F-statistic for $\gamma_1 = \gamma_1^*$	F-statistic for $\gamma_2 = \gamma_2^*$
All countries pooled ^a	42988	0.902	0.583	0.743	0.639	0.566	17.44**	8.72**
Common law pooled ^{a,b}	18034	0.899	0.572	0.860	0.637	0.612	23.11**	0.47
Code law pooled ^b	24954	0.909	0.596	0.561	0.644	0.476	0.48	21.83**

Panel B: Mishkin Test of Earnings—Pooled Samples

$$NI_{t+1} = \gamma_0 + \gamma_1 NI_t + \varepsilon_{t+1} \quad (1')$$

$$AR_{t+1} = \beta_0 + \beta_1(NI_{t+1} - \gamma_0^* - \gamma_1^* NI_t) + v_{t+1} \quad (2')$$

Country	N	β_1	γ_1	γ_1^*	F-statistic for $\gamma_1 = \gamma_1^*$
All countries pooled ^a	42988	0.924	0.636	0.602	1.54
Common law pooled ^{a,b}	18034	0.923	0.635	0.658	0.43
Code law pooled ^b	24954	0.928	0.639	0.501	15.98**

Panel C: Mishkin Tests of the Components of Earnings—By Country

$$NI_{t+1} = \gamma_0 + \gamma_1 ACC_t + \gamma_2 OCF_t + \varepsilon_{t+1} \quad (1)$$

$$AR_{t+1} = \beta_0 + \beta_1(NI_{t+1} - \gamma_0^* - \gamma_1^* ACC_t - \gamma_2^* OCF_t) + v_{t+1} \quad (2)$$

Country	n	β_1	γ_1	γ_1^*	γ_2	γ_2^*	F-statistic for $\gamma_1 = \gamma_1^*$	F-statistic for $\gamma_2 = \gamma_2^*$
Common Law Countries:								
Australia	1883	2.049	0.460	0.828	0.588	0.579	9.29**	0.02
Canada	2816	1.676	0.590	0.701	0.669	0.712	4.41*	0.34
Hong Kong	553	1.049	0.533	0.482	0.657	0.426	0.03	0.92
India	1245	2.097	0.647	0.722	0.691	0.629	0.21	0.21
Malaysia	2215	0.878	0.612	0.118	0.605	-0.094	7.04**	23.27**
Singapore	1471	1.839	0.631	0.271	0.619	0.289	8.00**	11.99**
Thailand	1369	2.389	0.603	0.632	0.603	0.317	0.07	8.22**
United Kingdom	6482	1.236	0.548	0.985	0.649	0.643	24.81**	0.02
United States	19039	2.089	0.613	0.879	0.717	0.777	33.38**	2.71 [^]
Code Law Countries:								
Denmark	504	1.391	0.592	0.604	0.582	0.500	0.23	0.77
France	2782	1.656	0.713	0.717	0.732	0.509	0.01	6.76**

(continued on next page)

TABLE 3 (Continued)

Panel C: Mishkin Tests of the Components of Earnings—By Country (Continued)

Country	n	β_1	γ_1	γ_1^*	γ_2	γ_2^*	F-statistic for $\gamma_1 = \gamma_1^*$	F-statistic for $\gamma_2 = \gamma_2^*$
Germany	2483	1.170	0.676	0.365	0.689	0.352	5.60*	12.75**
Indonesia	839	0.515	0.537	-1.173	0.397	1.289	4.81*	2.79^
Italy	785	1.545	0.706	0.460	0.719	0.134	0.79	8.45**
Japan	13822	1.634	0.471	0.538	0.502	0.332	1.38	15.48**
The Netherlands	842	1.219	0.673	0.551	0.656	0.437	0.46	3.01^
Spain	678	0.639	0.625	-1.432	0.669	-0.509	15.95**	9.27**
Sweden	777	1.550	0.703	0.698	0.762	0.454	0.03	9.43**
Switzerland	815	1.796	0.542	0.578	0.587	0.319	0.04	4.00*
Taiwan	627	2.019	0.561	0.379	0.597	0.134	1.19	12.32**

Panel D: Mishkin Test of Earnings—By Country

$$NI_{t+1} = \gamma_0 + \gamma_1 NI_t + \varepsilon_{t+1} \quad (1')$$

$$AR_{t+1} = \beta_0 + \beta_1 (NI_{t+1} - \gamma_0^* - \gamma_1^* NI_t) + v_{t+1} \quad (2')$$

Country	n	β_1	γ_1	γ_1^*	F-statistic for $\gamma_1 = \gamma_1^*$
Common Law Countries:					
Australia	1883	2.165	0.626	0.623	0.01
Canada	2816	1.704	0.718	0.745	0.13
Hong Kong	553	1.060	0.702	0.441	1.05
India	1245	2.779	0.797	0.825	0.09
Malaysia	2215	0.892	0.639	-0.013	22.29**
Singapore	1471	1.999	0.698	0.394	11.17**
Thailand	1369	2.664	0.640	0.462	4.07*
United Kingdom	6482	1.288	0.684	0.743	2.98^
United States	19039	2.252	0.791	0.881	11.80*
Code Law Countries:					
Denmark	504	1.355	0.590	0.467	0.55
France	2782	1.631	0.721	0.508	6.34*
Germany	2483	1.245	0.774	0.452	11.47**
Indonesia	839	0.742	0.458	0.942	1.83
Italy	785	1.780	0.779	0.321	6.48*
Japan	13822	1.681	0.523	0.399	8.36**
The Netherlands	842	1.495	0.804	0.612	2.85^
Spain	678	0.616	0.754	-0.635	10.63**
Sweden	777	1.678	0.790	0.564	6.23*
Switzerland	815	1.866	0.587	0.447	1.18
Taiwan	627	2.072	0.619	0.242	8.21**

**, *, ^ Represents statistical significance of F-statistics at the 1 percent, 5 percent, and 10 percent levels, respectively, two-tailed.

Sample consists of 62,027 firm-years from 1994–2002, with extreme observations winsorized at the 5th and 95th percentile values.

(continued on next page)

TABLE 3 (Continued)

* Excludes the U.S.

^b Common law countries in the sample are Australia, Canada, Hong Kong, India, Malaysia, Singapore, Thailand, United Kingdom, and United States. Code law countries are Denmark, France, Germany, Indonesia, Italy, Japan, The Netherlands, Spain, Sweden, Switzerland, and Taiwan.

NI is net income before extraordinary items (GVIC data 32) scaled by average total assets measured as the average of beginning and end of fiscal year total assets (GVIC data 89); *OCF* is operating cash flows scaled by average total assets. Operating cash flows is net income before extraordinary items plus Depreciation (GVIC data 11) minus change in Current assets (GVIC data 75 minus data 60) and plus change in Current liabilities (GVIC data 104 minus data 94); Accruals is *NI* minus *OCF*, and *ACC* is accruals scaled by average total assets; Abnormal return (*AR*) is annual holding period return, including dividends, minus the appropriate country index compiled by the investment bank Morgan Stanley (<http://www.msci.com>).

$F = 0.47$). On the other hand, stock prices underweight *OCFs* in code law countries ($\gamma_2 = 0.644 > 0.476 = \gamma_2^*$, $F = 21.83$).

Panel C of Table 3 presents results using firm-level data on an individual country basis. Consistent with Sloan (1996), we observe that U.S. stock prices overweight accruals persistence (i.e., $\gamma_1 = 0.613 < 0.879 = \gamma_1^*$, $F = 33.38$).⁶ We also find significant accruals overweighting in only Australia, Canada, and the U.K. Hence, we find evidence of accruals overweighting in four of the 20 countries. Failure to detect the accrual anomaly in other countries could reflect a lack of power due to relatively small country-specific sample sizes. However, we do not observe the accrual anomaly in Japan with a sample size of 13,822 firm-years, but do detect it in Australia with a much smaller sample of 1,883 firm-years, which suggests that lack of power is not a major problem in the analysis.

Also consistent with Sloan, untabulated results indicate that for the forecasting equation, the coefficient on *ACC* is statistically smaller than the coefficient on *OCF* in the pooled results, and in the U.S. and 13 other countries; the exceptions are Denmark, India, Malaysia, The Netherlands, Singapore, and Thailand, which together represent less than 13 percent of the firms in our sample. Hence, in general, firms with high accruals in the current year have lower earnings in the subsequent year, relative to the contribution of current operating cash flows to future earnings.

Unlike Sloan, we find no evidence that stock prices in the U.S. also underweight operating cash flow persistence; $\gamma_2 = 0.717$ and $\gamma_2^* = 0.777$; if anything, *OCFs* are marginally overweighted ($F = 2.71$). In addition, across the three other countries, Australia, Canada, and the U.K., where we observe accruals overweighting, there is no evidence of *OCF* underweighting. Note that Sloan examines U.S. firm-years over a different time period (1962–1991 versus 1994–2002) and employs a different database than we do. However, in unreported results, we are able to replicate our findings for U.S. firms using CRSP and Compustat data in our sample period, and we also find no evidence of *OCF* underweighting when we compute *OCF* using the income definition (i.e., operating income) considered by Sloan.

Consistent with Sloan, untabulated results indicate that the coefficient on *ACC* in the pricing regression is reliably larger than the coefficient on *OCF* for the U.S. (i.e., $\gamma_1^* = 0.879 < \gamma_2^* = 0.777$), and we find the same result in the pooled samples and separately for Australia and the U.K., but not Canada. Another set of untabulated results, in which

⁶ Notice that the coefficient estimates on β_1 across various countries are significantly higher than that obtained in the pooled regression. This is because the coefficient obtained in the pooled regression is not merely a linear combination of the individual β_1 s across countries. Rather, it is influenced by the covariances among the independent variables across countries. See Johnston (1984, 207–211).

we use decile ranks instead of actual values for accruals and operating cash flows, indicate that the coefficient on *ACC* in the pricing regression is reliably smaller than that on *OCF* for the U.S., which is also consistent with Sloan, and this result also holds for Canada and the U.K. Note that neither set of results is consistent with a naïve version of functional fixation, which would predict no differences in the pricing of *ACC* and *OCF*.

There are four countries—Germany, Malaysia, Singapore, and Spain—for which we find *underweighting* of *both* accruals and operating cash flows. In addition, *OCFs* are underweighted (but accruals are not) in France, Italy, Japan, The Netherlands, Sweden, Switzerland, Taiwan, and Thailand. Finally, for Indonesia we find both accruals underweighting and *OCF* overweighting. These results suggest that accruals over- or underweighting does not necessarily imply *OCF* under- or overweighting and vice versa (Houge and Loughran 2000).

In Panel B of Table 3 we report Mishkin test results for current year earnings used in forecasting and pricing next year's earnings. There is no evidence of earnings misweighting in the pooled results across all countries or for the group of common law countries, but there is evidence of significant underweighting of current year earnings in the pooled results for the code law group of countries ($\gamma_1 = 0.639$ and $\gamma_1^* = 0.501$, $F = 15.98$). The individual country results (Table 3, Panel D) indicate significant overweighting of current earnings in U.S. stock prices ($F = 11.80$), marginally significant overweighting in the U.K. ($F = 2.98$), and no evidence of misweighting in Australia and Canada. Sloan does not find earnings misweighting in the U.S. We detect earnings underweighting in 11 countries, and these are 11 of the 12 countries where we previously documented *OCF* underweighting (see Panel C of Table 3).⁷

The accounting literature has overwhelmingly emphasized accrual overweighting, and accordingly that is our focus in this paper; hence, we leave an investigation of *OCF* and earnings underweighting to future research.

III. CROSS-COUNTRY DIFFERENCES IN INSTITUTIONAL AND ACCOUNTING STRUCTURES AND THE OCCURRENCE OF THE ACCRUAL ANOMALY

Cross-Country Institutional Structures and the Occurrence of the Accrual Anomaly

The results in the previous section suggest that the occurrence of the accrual anomaly is related to the presence of a common law tradition, although the relation is not a perfect one since we do not detect the anomaly in all of the countries in our sample that have a common law tradition. In this section, we consider a larger set of country-level factors and their possible association with the accrual anomaly. More specifically, we identify three categories of accounting and institutional structures that *a priori* suggest possible systematic differences across countries regarding the occurrence of the anomaly. These are: (1) restrictions on insider trading as well as a country's legal tradition, (2) the extent of accrual usage permitted and shareholder protections, and (3) other characteristics of capital markets. We

⁷ It may seem that if the market overweights the accrual component of earnings but does not underweight the operating cash flow component, that overall earnings should not be correctly weighted by the market. However, this can occur depending on the covariance between accruals and cash flows. When earnings is the only variable whose misweighting is being tested, we do not have to worry about the covariance of the earnings components because the income statement linearly aggregates such components. But when we decompose earnings into accruals and operating cash flows, the covariance between accruals and operating cash flows is embedded in the weights assigned by the regression to these two components. Therefore, it is possible that such covariance can create a situation where earnings, by itself, is not misweighted although a component of earnings is misweighted. The proof is available from the authors upon request.

discuss our conjectures for each of these categories and then present the empirical analyses. Given the absence of strong theory in this area, we consider each conjecture independent of the others and view our analysis as exploratory.

A Country's Legal Tradition and Insider Trading Restrictions

As discussed in the previous section, we conjecture that a country's legal tradition, code law versus common law, affects the probability of occurrence of the accrual anomaly. Moreover, consistent with Ball et al. (2000) and Bushman and Piotroski (2004), we view legal tradition as the main proxy for cross-country differences in institutional structure, and thus we investigate the extent to which each of the other country-level factors we consider below is associated with the occurrence of the accrual anomaly incremental to a country's legal tradition. Our conjecture is:

C1: The occurrence of the accrual anomaly is more likely in countries with a common law tradition and than in countries with a code law tradition.

We expect that the more restrictions placed on insider trading, the less able insiders will be to trade on inside information about accruals and their expected persistence and, in turn, the more likely the accrual anomaly will occur. In the absence of insider trading restrictions, insiders can trade on private information and hence more quickly arbitrage away any accrual mispricing. We conjecture:

C2: The occurrence of the accrual anomaly is positively related to the strength of insider trading restrictions in a country.

We use Bhattacharya and Daouk's (2002) measure of insider trading restrictions. They obtained responses to two questions from national regulators of various countries: (1) When, if at all, were insider trading laws established in your exchanges? (2) When, if at all, was the first prosecution under these laws? Because virtually all countries in our sample had insider trading laws by the start of our sample period, we use the responses to the second question as our proxy for insider trading restrictions. In particular, we treat countries where prosecutions under insider trading laws took place prior to 1996 as countries with significant insider trading restrictions.

The Extent of Accrual Usage Permitted and Shareholder Protections to Mitigate Earnings Management

Hung (2001) argues that firms have more opportunities to manage earnings in countries that permit a higher use of accrual accounting. She finds that the value-relevance of earnings is negatively related to the extent to which accrual accounting is permitted in a country, which suggests that the opportunities to manipulate accruals dominate the benefits of accruals to reflect a better measure of performance than cash-basis accounting. Given that the accrual anomaly stems from the capital markets' overweighting of the accruals component of earnings, it is reasonable to expect that the accrual mispricing is more likely to occur the more extensively a country permits firms to use accrual accounting. Hence, we expect the occurrence of the accrual anomaly will be positively related to the extent of accrual accounting, and we conjecture:

C3: The occurrence of the accrual anomaly is positively related to the extent of accrual accounting permitted in a country.

We use a country-specific index developed by Hung (2001) to estimate the extent of accrual accounting in different countries (i.e., the extent to which a country's accounting policies depart from a cash basis). The accrual index reflects an equal weighting of 11 accrual-related accounting standards for each country, based on a summary of international accounting standards (Coopers & Lybrand 1993). Higher accrual index values represent a higher proportion of accounting treatments that allow the generation of accruals. For example, allowing capitalization and amortization of R&D yields a higher accrual index than requiring expensing of R&D.

Hung (2001) also finds the presence of investor protections in a country significantly mitigates the negative effect that higher use of accruals has on the value-relevance of earnings. That is, stronger outside shareholder rights and their more rigorous enforcement reduce the ability of managers to manipulate earnings. This leads to the prediction that the accrual anomaly is less likely to occur the stronger are a country's shareholder protections. We conjecture:

C4: The occurrence of the accrual anomaly is negatively related to the strength of shareholder protection in a country.

Consistent with Leuz et al. (2003) and Hung (2001), we use outside investor rights and legal enforcement as determined by La Porta et al. (1998) as proxies for strength of shareholder protection. La Porta et al. (1998) use an anti-director rights index that captures the voting rights of minority shareholders to gauge outside investor rights. Legal Enforcement is measured as the mean score across three variables: (1) an index of the efficiency of the judicial system, (2) an index based on an assessment of the rule of law, and (3) a corruption index.

Characteristics of Countries' Equity Markets

Alford et al. (1993) and Ali and Hwang (2000) find that earnings are more value-relevant in the U.S. vis-à-vis reporting of earnings in other countries. This suggests the possibility that in countries where the importance of earnings for security pricing is greater, managers can have greater incentives to manipulate earnings. If so, then the accrual anomaly should be more prevalent the more important is the role of earnings in security pricing. We expect that earnings are relatively more important in countries where equity markets are a relatively important source of capital. Hence, we predict that the accrual anomaly is more likely to occur the greater the importance of equity markets to an economy. Our conjecture is:

C5: The occurrence of the accrual anomaly is positively related to the importance of the equity markets in a country.

As in Leuz et al. (2003) and Hung (2001), we measure the importance of equity markets following La Porta et al. (1997). It is a country's average rank based on (1) the ratio of the aggregate stock market held by minority shareholders to gross national product, (2) the number of listed domestic stocks in a country relative to its population, and (3) the number of IPOs in a country relative to its population.

Another important characteristic of a country's equity market with regard to the accrual anomaly is likely to be the extent of ownership concentration. In economies where share ownership is dispersed, investors rely relatively more on reported earnings to address the information asymmetry between a firm's managers and equity market participants (Warfield

et al. 1995). We observe security analysts and investors devoting a great deal of attention to firms' reported earnings; earnings forecasts are widely disseminated in the financial press, and revisions in analysts' forecasts are closely followed. However, as suggested above, a greater focus on earnings may increase the incentives to manage earnings and, hence, increase the probability of accrual mispricing. In addition, a greater concentration of ownership increases the probability that holders of large blocks of shares are effectively insiders with greater access to information about the components of earnings. Consistent with this, Beneish and Vargus (2002) find that insiders in the U.S. behave as if they trade on information about the underlying persistence of income-increasing accruals. Thus, to the extent there is greater concentration of ownership, we would expect little if any overweighting of accruals and, hence, a lower probability the accrual anomaly will occur. Our conjecture is:

C6: The occurrence of the accrual anomaly is negatively related to the degree of concentration of share ownership in a country.

We use a country's median percentage of common shares owned by the three largest shareholders in the ten largest nonfinancial firms as our ownership concentration proxy (La Porta et al. (1998).

Descriptive Statistics

We report descriptive statistics for a set of country-level variables in Table 4, and define here the subset of variables we conjecture are possible determinants of the occurrence of the anomaly:

ComLaw_j = Common Law = 1 if country *j*'s legal tradition is common law, and 0 if code law, based on La Porta et al. (1998);

InsiderTrad_j = Insider Trading = 1 if country *j* had at least one prosecution under insider trading laws prior to 1996, and 0 otherwise, based on Bhattacharya and Daouk (2002);

AccIndex_j = Accrual Index = an equally weighted index of 11 accrual-related accounting standards in country *j*, developed by Hung (2001);⁸

InvRights_j = Outside Investor Rights = an aggregate measure for country *j*, varying from 0 to 5, of minority shareholder rights, based on the anti-director rights index developed by La Porta et al. (1998);

LegEnforce_j = Legal Enforcement = the mean score for country *j*, varying from 0 to 10, of three legal variables (efficiency of the judicial system; assessment of rule of law; and corruption index), developed by La Porta et al. (1998);

ImpEquity_j = Importance of Equity Markets = the mean rank for country *j* across three variables (ratio of the aggregate stock market capitalization held by minorities to GNP, number of listed domestic firms relative to the population, and number of IPOs relative to the population) with higher scores indicating greater importance of the stock market, developed by La Porta et al. (1997); and

OwnConcen_j = Ownership Concentration = median for country *j* of the percentage of common shares owned by the three largest stockholders in the ten largest privately owned nonfinancial firms, developed by La Porta et al. (1998).

⁸ We obtain data to compute *AccIndex* following Hung's (2001) approach for two countries not in her sample, India and Indonesia, but we have insufficient data to compute *AccIndex* for Malaysia, Taiwan, and Thailand.

TABLE 4
Country Characteristics

Country	Filing Deadline	Outsider Investor Rights	Legal Enforcement	Importance of Equity Market	Ownership Concentration	Accrual Index	Insider Trading Existence	Insider Trading Enforcement	DS%
Common Law Countries:									
Australia	4	4	9.5	24.0	0.28	0.82	1991	1996	99.7
Canada	4	5	9.8	23.3	0.24	0.82	1966	1976	100.0
Hong Kong	6	5	8.9	28.8	0.54	0.64	1991	1994	99.6
India	6	5	5.6	14.0	0.43	0.41	1992	1998	100.0
Malaysia	7	4	7.7	25.3	0.52	—	1973	1996	99.1
Singapore	3	4	8.9	28.8	0.53	0.64	1973	1978	99.5
Thailand	3	2	4.9	14.3	0.48	—	1984	1993	99.6
United Kingdom	6	5	9.2	25.0	0.15	0.82	1980	1981	99.8
United States	3	5	9.5	23.3	0.12	0.86	1934	1961	100.0
Code Law Countries:									
Denmark	6	2	10.0	20.0	0.40	0.55	1991	1996	95.6
France	6	3	8.7	9.3	0.24	0.64	1967	1975	89.0
Germany	8	1	9.1	5.0	0.50	0.41	1994	1995	79.1
Indonesia	4	2	2.9	4.7	0.62	0.59	1991	1996	99.9
Italy	4	1	7.1	6.5	0.60	0.45	1991	1996	72.4
Japan	3	4	9.2	16.8	0.13	0.55	1988	1990	98.7
The Netherlands	5	2	10.0	19.3	0.31	0.73	1989	1994	89.9
Spain	6	4	7.1	7.2	0.50	0.77	1994	1998	99.3
Sweden	6	3	10.0	16.7	0.28	0.59	1971	1990	97.0
Switzerland	6	2	10.0	24.8	0.48	0.32	1988	1995	47.5
Taiwan	4	3	7.4	13.3	0.14	—	1988	1989	100.0

Common law (code law) distinction is based on a country's legal tradition (La Porta et al. 1998). Outside Investor Rights is an aggregate measure ranging from 0 to 5 (5 implies higher minority shareholder rights), based on the anti-director rights index developed by La Porta et al. (1998). Legal enforcement is a mean score, varying from 0 to 10, of three legal variables (efficiency of the judicial system; assessment of rule of law; and corruption index), developed by La Porta et al. (1998). Importance of Equity Markets = the mean rank across three variables (ratio of the aggregate stock market capitalization held by minorities to GNP; number of listed domestic firms relative to the population; and number of IPOs relative to the population) with higher scores indicating greater importance of the stock market, developed by La Porta et al. (1997). Ownership Concentration is the median of the percentage of common shares owned by the three largest stockholders in the ten largest privately owned nonfinancial firms, developed by La Porta et al. (1998). Accrual Index is an equally weighted index of 11 accrual-related accounting standards in each country, developed by Hung (2001). Insider Trading Existence captures when insider trading laws were introduced and insider trading enforcement captures the year in which the first prosecution under insider trading laws took place. Both insider trading variables are obtained from Bhattacharya and Daouk (2002). DS% is the proportion of firms that use domestic accounting standards (Global Vantage codes firms using domestic standards as "DS").

Nine of the 20 countries have a common law tradition, while 11 have a code law tradition. Seven countries had no prosecutions under insider trading laws prior to 1996, with India and Spain bringing their first prosecutions in 1998.

Accrual accounting is permitted to the greatest extent in the U.S. (*AccIndex* = 0.86), with Australia, Canada, and the U.K. also ranking high. The median *AccIndex* across the 17 countries for which we have *AccIndex* data is 0.59; the lowest score is 0.32 in Switzerland, with Germany and India also allowing only limited use of accrual accounting. Table 4 also includes data on the percentage of firms domiciled in a given country that adhere to that country's domestic accounting standards (DS%). Overwhelmingly, firms follow their domestic GAAP. The median percentage of firms using domestic GAAP is 99.2 percent and DS% is below 80 percent for only three countries, with Switzerland being the outlier at 47.5 percent.⁹ Our two shareholder rights variables are Outsider Investor Rights and Legal Enforcement. Canada, Hong Kong, the U.K. and the U.S. each have the highest ranking (5) on *InvRights*, whereas Germany and Italy have the lowest ranking (1). The median is 3.5. The countries with the highest enforcement of shareholder rights are Denmark, The Netherlands, Sweden, and Switzerland, while Indonesia has the lowest level. The median *LegEnforce* value is 9, suggesting that rigorous enforcement is generally widespread.

Importance of Equity Markets ranges from 28.8 for Hong Kong and Singapore to 5 for Germany; the median *ImpEquity* value is 18. The countries with the most concentrated ownership of shares are Indonesia and Italy (*OwnConcen* of 62 percent and 60 percent, respectively). The median is 41.5 percent. The U.S. has the lowest *OwnConcen* value (12 percent), followed closely by Japan, Taiwan, and the U.K.

Table 5, Panel A presents correlations of country-level variables across our sample of 20 countries (17 for *AccIndex*). *ComLaw* is positively associated with *InvRights*, *ImpEquity*, and *AccIndex*. *InvRights* is negatively related to *OwnConcen* and positively related to *ImpEquity* and *AccIndex*. *InvRights* is not significantly correlated with *LegEnforce*, which suggests that outside investor rights and legal enforcement reflect different aspects of shareholder protections. *LegEnforce* is positively associated with *ImpEquity* and *InsiderTrad* enforcement, and negatively associated to *OwnConcen*. Finally, *OwnConcen* is negatively related to *InsiderTrad* enforcement and the *AccIndex*. The presence of significant correlations between various country-level characteristics hints at potential collinearity problems for our multivariate analysis.

Country-Level Results

We use correlation and regression analyses to investigate our cross-country conjectures about accounting and institutional factors associated with the occurrence of the accrual anomaly. We create an accrual anomaly variable (*AccAnom*) that equals 1 for each country—Australia, Canada, the U.K., and the U.S.—for which we find significant support for accrual overweighting in the Mishkin tests (Table 3, Panel C).¹⁰

In the correlation analysis, we separately examine the association between *AccAnom* and each of the seven accounting and institutional structure variables. The results are in the first row of Table 5, Panel A, and as expected indicate the occurrence of the accrual anomaly is significantly and positively correlated with *ComLaw* tradition ($\rho = 0.55$),

⁹ Ashbaugh and Pincus (2001) report that Switzerland had relatively few accounting measurement choice restrictions in the early 1990s, and Swiss firms were more likely to adopt International Accounting Standards than firms from any of the other 12 non-U.S. countries they examine.

¹⁰ The results of abnormal returns tests reported below in Table 6, Panel B, confirm the Mishkin test results.

TABLE 5
Correlation Statistics and Regression Analysis

Panel A: Correlation Statistics						
	<i>ComLaw</i>	<i>InvRights</i>	<i>LegEnforce</i>	<i>ImpEquity</i>	<i>OwnConcen</i>	<i>AccIndex</i>
<i>AccAnom.</i>	0.55					
Significant (1,0)	(0.01)	0.54 (0.01)	0.32 (0.16)	0.41 (0.07)	-0.54 (0.01)	0.72 (0.00)
<i>ComLaw</i>		0.69 (0.00)	-0.03 (0.92)	0.64 (0.00)	-0.05 (0.84)	0.48 (0.05)
<i>InvRights</i>			0.17 (0.86)	0.57 (0.01)	-0.42 (0.07)	0.58 (0.01)
<i>LegEnforce</i>				0.55 (0.01)	-0.48 (0.03)	0.20 (0.42)
<i>ImpEquity</i>					-0.22 (0.33)	0.35 (0.17)
<i>OwnConcen</i>						-0.53 (0.03)
<i>AccIndex</i>						0.11 (0.65)

Panel B: Regression Analysis						
$AccAnom_j = \beta_0 + \beta_1 ComLaw_j + \beta_2 InsiderTrad_j + \beta_3 AccIndex_j + \beta_4 InvRights_j + \beta_5 LegEnforce_j + \beta_6 ImpEquity_j + \beta_7 OwnConcen_j + \varepsilon_j$ (5)						
	Predicted Sign	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
<i>ComLaw</i>	+	0.44** (2.74)	0.36* (2.28)	0.28^ (1.29)	0.39* (1.87)	0.42** (3.32)
<i>InsiderTrad</i>	+					0.77** (3.07)
<i>AccIndex</i>	+					-0.12 (-0.76)
						0.99* (1.97)

(continued on next page)

TABLE 5 (Continued)

<i>InvRights</i>	+/-	0.09 (1.10)			-0.17* (-1.90)
<i>LegEnforce</i>	+/-		0.07^ (1.82)		0.00 (0.02)
<i>ImpEquity</i>	+			0.01 (0.38)	-0.00 (-0.30)
<i>OwnConcen</i>	-				-1.27** (-3.26)
Adjusted R ²		0.23	0.28	0.23	-1.47* (-2.38)
n		20	20	20	0.69
					17

**, *, ^ Represents statistical significance at 1 percent, 5 percent, and 10 percent levels, respectively, one- (two-) tailed when the coefficient is predicted (not predicted) t-statistic in parentheses.

AccAnom, is 1 for Australia, Canada, the U.K., and the U.S., the countries for which we found significant support for accrual overweighting in the Mishkin (and subsequent abnormal accruals) tests, and 0 otherwise; *ComLaw* is a dummy variable that takes on the value of 1 for common law countries, and 0 for code law countries (based on a country's legal tradition per La Porta et al. 1998); *AccIndex* is an equally weighted index of 11 accrual-related accounting standards in each country, developed by Hung (2001); *InvRights* is an aggregate measure of outside investor rights ranging from 0 to 5 (5 implies higher minority shareholder rights), based on the anti-director rights index developed by La Porta et al. (1998); *LegEnforce* measures the legal enforcement in a country. It is a mean score, varying from 0 to 10, of three legal variables (efficiency of the judicial system, assessment of rule of law, and corruption index), developed by La Porta et al. (1998); *ImpEquity* captures the importance of equity markets in a country and is the mean rank across three variables (ratio of the aggregate stock market capitalization held by minorities to GNP; number of listed domestic firms relative to the population; and number of IPOs relative to the population) with higher scores indicating greater importance of the stock market, developed by La Porta et al. (1998); *OwnConcen* measures the level of ownership concentration as the median of the percentage of common shares owned by the three largest stockholders in the ten largest privately owned nonfinancial firms, developed by La Porta et al. (1998); *InsiderTrad* is a dummy that takes on the value of 1 if a country had prosecuted a case under insider trading laws prior to 1996, and 0 otherwise, based on data in Bhattacharya and Daouk (2002).

AccIndex ($\rho = 0.72$), and *ImpEquity* ($\rho = 0.41$), and significantly and negatively correlated with *OwnConcen* ($\rho = -0.54$). Surprisingly, *AccAnom* and *InvRights* are positively related ($\rho = 0.54$), as are *AccIndex* and *LegEnforce* ($\rho = 0.32$), although the latter correlation is not significant.

As noted earlier, Ball et al. (2000) and Bushman and Piotroski (2004) suggest that legal tradition is the primary proxy for cross-country differences in institutional structure. Hence, we investigate the extent to which each of the other institutional factors is associated with the occurrence of the accrual anomaly incremental to *ComLaw*. We do this by estimating the following model using OLS (the subscripts indicate the j th country):¹¹

$$AccAnom_j = \beta_0 + \beta_1 ComLaw_j + \beta_1 Institutional\ factor_j + \varepsilon_j \quad (4)$$

where *Institutional factor_j* is, in turn, *InsiderTrad_j*, *AccIndex_j*, *InvRights_j*, *LegEnforce_j*, *ImpEquity_j*, or *OwnConcen_j*, each of which has previously been defined. We also estimate a full model with all of the institutional factors included:

$$AccAnom_j = \beta_0 + \beta_1 ComLaw_j + \beta_2 InsiderTrad_j + \beta_3 AccIndex_j + \beta_4 InvRights_j + \beta_{4b} LegEnforce_j + \beta_5 ImpEquity_j + \beta_6 OwnConcen_j + \varepsilon_j \quad (5)$$

Based on the conjectures we develop above, we expect positive coefficients for *ComLaw_j*, *InsiderTrad_j*, *AccIndex_j*, and *ImpEquity_j*, and negative coefficients for *OwnConcen_j*, *InvRights_j*, and *LegEnforce_j*. However, recall Table 5, Panel A reports generally positive correlations for the shareholder rights variables (*InvRights* and *LegEnforce*) with each of the factors expected to be positively related to *AccAnom*, and negative correlations for the shareholder rights variables and *OwnConcen*, which is expected to be negatively related to *AccAnom*. Observing such correlations in the absence of strong theory argues for modifying C4 to allow for a positive or negative relation between the strength of a country's shareholder protections and occurrence of the anomaly.

The regression results are in Table 5, Panel B. The adjusted R^2 s for the seven models we estimate range from 23 percent to 69 percent. As expected, the coefficient on *ComLaw_j* is reliably positive in all of the regressions. After controlling for *ComLaw_j*, separate regression results indicate, as predicted, a reliably positive coefficient on *AccIndex_j* (one-tailed p -value < 0.01) and a reliably negative coefficient on *OwnConcen_j* (one-tailed p -value < 0.01). In the full model, which includes all of the institutional factors, as predicted there are significantly positive coefficients on *ComLaw_j* and *AccIndex_j*, and significantly negative coefficients on *OwnConcen_j* and *InvRights_j*. Thus, the accrual anomaly is more likely to occur in countries with a common law tradition, where more extensive use of accrual accounting is permitted, and where ownership of shares is more widely dispersed. There is also evidence (in the full model only) that the occurrence of the accrual anomaly is also related to the presence of weak outside shareholder rights.

Collinearity diagnostics reveal condition indices in excess of 18 for *OwnConcen* and *InsiderTrad* and over 50 for *AccIndex*, suggesting the presence of multicollinearity. Because multicollinearity is generally viewed as a concern if one does not detect significant results as predicted (e.g., Belsley et al. 1980), we conclude that it does not appear to be a major

¹¹ Country-level factors presumably are determined endogenously. However, with complete data for only 17 countries, econometric techniques such as 2SLS that would account for that are unlikely to yield reliable estimates.

problem in our sample, although it can induce incorrect coefficient signs.¹² We also note *AccAnom*_{*i*} is a 0,1 dependent variable, and thus Logit (or probit) estimation is preferred over OLS. However, we are unable to get convergence using Logit or probit to estimate the full model, probably because we only have 17 countries with the required data to estimate the model and also perhaps because of multicollinearity.¹³

IV. ABNORMAL RETURNS TESTS: FURTHER ANALYSIS OF H1 AND AN INVESTIGATION OF ALTERNATIVE EXPLANATIONS FOR THE ACCRUAL ANOMALY

In this section we conduct abnormal returns tests using firm-level data from each of the 20 countries in our sample. We begin by outlining the methodology and reporting the results of abnormal returns tests of our basic research hypothesis. We then turn to our primary purpose, which is to investigate alternative explanations for the accrual anomaly and thus provide evidence on the ability of each alternative to explain the anomaly in an international setting.

Abnormal Returns Tests of H1

While the Mishkin test results provide evidence on the generalizability of accrual overweighting in stock prices, following Sloan (1996) we also assess whether abnormal returns can be earned by taking trading positions on the accruals variable to provide additional, confirmatory evidence on H1. Given the Mishkin test results of accrual overweighting in Australia, Canada, the U.K., and the U.S., we expect that accruals will predict future returns in those countries.

The strategy we implement relies on the construction of zero-investment portfolios (Fama and MacBeth 1973). First, we calculate each firm's accrual decile rank separately for each year from 1994 through 2002, and follow the same procedure to determine decile ranks for operating cash flows. Next, we form portfolios using the decile ranks. More specifically, we calculate scaled-decile rank for accruals for each firm in each year by annually ranking accrual values into deciles (0 to 9) and dividing the decile number by 9 such that each observation related to accruals takes a value ranging between 0 and 1. We denote the variable as ACC^{dec}_{it} , where the "dec" superscript indicates a scaled decile rank. Because we have a maximum of nine years of data and often very few observations each year, it would be very difficult to estimate the relation between abnormal returns and the

¹² The regression findings of a positive coefficient on *ComLaw* and a negative coefficient on *InvRights* would seem to be contradictory since strong investor protection is generally an outcome of common law legal systems. As noted, the correlations in Table 5, Panel A indicate *ComLaw* and *InvRights* are highly positively correlated, as are the correlations between the occurrence of accrual anomaly and *ComLaw* and *InvRights*, respectively. A high degree of multicollinearity in a multivariate regression model can cause coefficients to have the wrong sign (Greene 1993), and this may be the reason for the contradictory results. However, we view our conjectures as *ex ante* theoretical arguments based on plausible economic ideas, regardless of how we empirically measure the underlying constructs, and it is conceivable that the relation between *AccAnom* and *InvRights* could be negative after controlling for common law tradition. *Ex post*, we may have a multicollinearity problem suggesting that the readers interpret our results with caution, especially regarding C4. But poor measures (i.e., correlation between the proxies for common law tradition and investor rights, etc.) do not, in our view, invalidate the theoretical conjectures.

¹³ We constructed a variable that captures relative accrual overweighting across countries. In particular, we take a country's F-statistic of accrual misweighting from the Mishkin tests (Table 3, Panel C) and multiply it by 1 (-1) if the country exhibits accruals over- (under-)weighting. We then use the relative rank of this variable as our *LHS* variable. A higher (lower) rank indicates accruals over- (under-)weighting. Untabulated results are similar except *ComLaw* is not significant in two of the separate regressions and *AccIndex* is not significant in the full model. Such weaker results likely reflect measurement error in the constructed *LHS* variable.

ACC^{dec} variable on an annual basis. Therefore, we estimate Equation (4) below using the Generalized Method of Moments procedure with Newey and West (1987) correction for autocorrelation for one lag.

The basic idea behind Fama and MacBeth (1973) regressions is to project abnormal returns on an intercept and the ACC^{dec}_i variable. The coefficient on ACC^{dec}_i represents the country-adjusted abnormal return to a zero-investment portfolio optimally formed to exploit the information in the accruals variable, where the weights assigned to each firm in the ACC^{dec}_i variable, represented by the rows of the matrix $(X'X)^{-1}X'$ where $X = [1, ACC^{dec}_i]$, sum to zero. Our strategy involves taking positions in firms beginning with the month after their country-specific filing deadline following fiscal year-end to allow for the determination of portfolio weights from $(X'X)^{-1}X'$ used to ascertain the investment positions. Firms receiving negative weights are sold short and firms with positive weights are bought, and the long and short positions are closed after one year. Abnormal returns to this strategy are comparable to abnormal returns to a zero-investment portfolio with long and short positions, respectively, in firms within the lowest and highest deciles of accruals (Bernard and Thomas 1990).

Fama and French (1998) show that future abnormal returns are associated with other variables, including firm size, the book-to-market ratio, and the earnings-to-price ratio, for most countries we examine. It is plausible that potential abnormal returns related to accruals are not independent of returns observed in connection with these variables. Hence, we control for these factors by including them in the model and estimate the following regression (suppressing firm-specific subscripts):

$$AR_{t+1} = \delta_0 + \delta_1 ACC^{dec}_i + \delta_2 SIZE^{dec}_i + \delta_3 EP^{dec}_i + \delta_4 BM^{dec}_i + \varphi_{t+1} \quad (6)$$

where $SIZE^{dec}_i$, EP^{dec}_i , and BM^{dec}_i relate to scaled-decile ranks (ranging from 0 to 1) for the size, earnings-to-price, and book-to-market portfolios, respectively. In the regression specification (6), coefficient δ_1 represents the *incremental* abnormal return to a zero-investment portfolio in the accruals variable. Recalling that ACC^{dec}_i ranges from 0 to 1, if accruals overweighting predicts future returns, then long (short) positions in firms within the lowest (highest) deciles of accruals implies that δ_1 should be negative (i.e., $\delta_1 < 0$).

The ACC^{dec} column in Table 6, Panel A displays the results of estimating Equation (6). Consistent with Sloan, a zero-investment portfolio in accruals of U.S. firms earns an abnormal return of 8.4 percent over the next year ($\delta_1 < 0$, p-value < 0.01). Consistent with our Mishkin test results, Australia, Canada, and the U.K. also have a negative and significant δ_1 .

There are several countries (Hong Kong, India, The Netherlands, Sweden, and Switzerland) where the abnormal returns (δ_1) are negative but not statistically significant at the 10 percent level. One plausible explanation for the insignificant results is lack of power of our abnormal returns tests. To assess the power of our tests, we include in Panel A of Table 6 a column indicating the sample size needed for the observed abnormal return to achieve statistical significance at the 5 percent level. Statistical significance indicating accrual overweighting would have been achieved for Sweden only with a more than doubling of the sample size, and it would require a quadrupling of the sample sizes for India and Switzerland. Hence, in general, sample size does not appear to be a major impediment to reaching statistical significance.

Unexpectedly, there are also significantly negative abnormal returns for Denmark, France, Germany, Italy, Japan, Malaysia, and Thailand, even though the Mishkin test results do not indicate accrual overweighting for these countries. We conjecture that the reason for

significant abnormal returns obtained for these countries is more consistent with returns to operating cash flow underweighting than to accruals overweighting because (1) the results of the Mishkin analysis suggest that in these countries, taking positions on operating cash flows, should obtain abnormal returns; and (2) *ACC* and *OCF* are more negatively correlated for these countries than for most of the other countries (see Table 2). To investigate this conjecture, we augment Equation (6) by including OCF^{dec} as an additional control variable; i.e., we estimate:

$$AR_{t+1} = \delta_0 + \delta_1 ACC^{dec}_t + \delta_2 SIZE^{dec}_t + \delta_3 EP^{dec}_t + \delta_4 BM^{dec}_t + \delta_5 OCF^{dec}_t + \varphi_{t+1} \quad (6a)$$

The evidence presented in the ACC^{dec} column of Table 6, Panel B is highly consistent with our conjecture. The significantly negative coefficients on ACC^{dec} for Australia, Canada, the U.K., and the U.S. remain after including *OCF* as an additional variable in the abnormal returns regression, ranging in value from -0.069 to -0.151 . Moreover, δ_1 is no longer significantly negative for any other country. Similar to Panel A, we also assess the power of our tests in Panel B. There are five countries with negative coefficients on ACC^{dec} , yet

TABLE 6
Regression Tests of Abnormal Returns

Panel A: Abnormal Returns on Accruals

$$AR_{t+1} = \delta_0 + \delta_1 ACC^{dec}_t + \delta_2 SIZE^{dec}_t + \delta_3 EP^{dec}_t + \delta_4 BM^{dec}_t + \varphi_{t+1} \quad (6)$$

Country	n	ACC^{dec}	n to Achieve Statistical Significance at 5% level	$SIZE^{dec}$	EP^{dec}	BM^{dec}
Common Law Countries:						
Australia	1883	-0.179**	606	-0.136*	0.131*	0.005
Canada	2816	-0.083*	2733	-0.325**	0.115*	-0.206**
Hong Kong	553	-0.050	6022	-0.087	0.137	0.142
India	1245	-0.047	5887	-0.064	0.035	0.041
Malaysia	2215	-0.086*	1089	-0.082*	0.154**	0.108**
Singapore	1471	0.014	68555	-0.066	0.187**	0.143**
Thailand	1369	-0.206**	438	-0.171*	0.282**	0.243**
United Kingdom	6482	-0.099**	998	-0.142**	0.026	-0.081*
United States	19039	-0.084**	4491	-0.278**	-0.018	-0.076**
Code Law Countries:						
Denmark	504	-0.085^	834	0.189*	0.057	0.092
France	2782	-0.082^	3159	0.059	0.128**	0.016
Germany	2483	-0.066^	3828	0.088**	0.149**	0.025
Indonesia	839	0.126	2021	-0.114	-0.122	0.411**
Italy	785	-0.117^	913	-0.043	0.125^	0.091
Japan	13822	-0.058**	1431	0.031**	0.094**	0.134**
The Netherlands	842	-0.022	12396	0.016	0.068	-0.027
Spain	678	0.070	1042	0.037	0.241**	0.034
Sweden	777	-0.092	1615	-0.076	0.269**	-0.119
Switzerland	815	-0.049	3575	-0.064	0.061	-0.105
Taiwan	627	0.005	273391	-0.065	0.197**	0.022

(continued on next page)

TABLE 6 (Continued)

Panel B: Abnormal Returns on Accruals after Controlling for Operating Cash Flows-to-Assets

$$AR_{t+1} = \delta_0 + \delta_1 ACC^{dec}_t + \delta_2 SIZE^{dec}_t + \delta_3 EP^{dec}_t + \delta_4 BM^{dec}_t + \delta_5 OCF^{dec}_t + \varphi_{t+1} \quad (6a)$$

Country	n	ACC^{dec}	n to Achieve Statistical Significance at 5% level	$SIZE^{dec}$	EP^{dec}	BM^{dec}	OCF^{dec}
Common Law Countries:							
Australia	1883	-0.151*	1530	-0.123*	0.198**	-0.013	-0.118
Canada	2816	-0.084*	2821	-0.325**	0.116^	-0.206**	-0.002
Hong Kong	553	-0.005	852434	-0.102	0.097	0.148	0.075
India	1245	0.031	43397	-0.078	-0.006	0.093	0.112
Malaysia	2215	0.049	10483	-0.099*	0.047	0.132**	0.186**
Singapore	1471	0.233**	502	-0.093^	0.034	0.177**	0.293**
Thailand	1369	-0.009	3682	-0.188*	0.204*	0.257**	0.142
United Kingdom	6482	-0.107*	3364	-0.140**	0.033	-0.085*	-0.013
United States	19039	-0.069**	6195	-0.298**	-0.111**	-0.051*	0.077**
Code Law Countries:							
Denmark	504	0.031	16758	0.166*	-0.009	0.134	0.153^
France	2782	0.029	76951	0.049	0.058	0.057	0.153*
Germany	2483	-0.028	37105	0.086*	0.128**	0.033	0.048
Indonesia	839	0.268*	702	-0.149	-0.263	0.406*	0.228^
Italy	785	0.043	8445	-0.044	0.040	0.134*	0.208*
Japan	13822	-0.017	41677	0.033	0.102	0.132	0.071**
The Netherlands	842	0.051	7021	0.013	0.029	0.013	0.104
Spain	678	0.056	3270	0.038	0.250**	0.028	-0.020
Sweden	777	0.013	87964	-0.106	0.131	-0.088	0.208*
Switzerland	815	-0.004	1687995	-0.068	0.027	-0.076	0.064
Taiwan	627	0.238**	195	-0.083	0.010	0.141	0.363**

**, *, ^ Represents statistical significance of t-statistics at 1 percent, 5 percent, and 10 percent levels, respectively, one- (two-) tailed for ACC^{dec} and OCF^{dec} (other variables). We estimate Equations (6) and (6a) using the Generalized Method of Moments procedure with Newey and West (1987) correction for autocorrelation for one lag.

Sample consists of 62,027 firm-year observations from 1994–2002.

NI is the decile rank related to net income before extraordinary items (GVIC data 32) scaled by average total assets measured as the average of beginning and end of fiscal year total assets (GVIC data 89); OCF^{dec} is the decile rank of operating cash flows scaled by average total assets. Operating cash flows is net income before extraordinary items plus Depreciation (GVIC data 11) minus change in Current assets (GVIC data 75 minus data 60) and plus change in Current liabilities (GVIC data 104 minus data 94). Accruals is NI minus OCF , while ACC^{dec} is the decile rank of accruals scaled by average total assets; $SIZE^{dec}$ is market value of common equity measured in a country's own currency at the beginning of the return accumulation period, then ranked within the country, and transformed to a scaled-decile variable ranging from 0 to 1. Thus currency translation issues do not pose a concern for our analysis; EP^{dec} is earnings-to-price ratio (stock price measured at the beginning of the return accumulation period), transformed to a scaled-decile variable ranging from 0 to 1; BM^{dec} is the natural logarithm of the book-to-market ratio measured at the beginning of the return accumulation period, transformed to a scaled-decile variable ranging from 0 to 1. Abnormal return (AR) is the annual holding period return, including dividends, minus the appropriate country index compiled by the investment bank Morgan Stanley (<http://www.msci.com>).

sample size does not appear to be an impediment to reaching statistical significance. For example, Germany has the largest magnitude coefficient of the five countries (-0.028), but it would take a 14-fold increase in sample size for its coefficient to become significant.

We note a *positive* and significant δ_1 for Indonesia, Singapore, and Taiwan after controlling for *OCF*. The Mishkin tests for Indonesia and Singapore indicate accrual *underweighting*, although this is not the case for Taiwan (see Table 3, Panel C). Hence, there is evidence of positive returns for an accrual underweighting strategy in Indonesia and Singapore.

In summary, it is only for Australia, Canada, the U.K., and the U.S. that Mishkin tests indicate the presence of accruals overweighting in pricing, and abnormal returns tests indicate that abnormal returns can be earned based on an accruals overweighting trading strategy after controlling for firm size, book-to-market, earnings-to-price, and operating cash flows.

Sensitivity Tests

Our results of separate country abnormal returns (and Mishkin) tests of H1 are robust to several sensitivity checks summarized below. First, the accruals measure we use is estimated using data from successive balance sheets as opposed to using reported operating cash flows under SFAS No. 95. While this is typical in international accounting research (e.g., Bhattacharya et al. 2003; Land and Lang 2003; Leuz et al. 2003), Hribar and Collins (2002) show that accruals derived from balance sheet data contain significant measurement error, especially for firms involved in mergers and divestitures. Global Vantage has no analog to SFAS No. 95 disclosures of operating cash flows for the foreign countries we examine. However, to ensure that our results are robust to this problem, we eliminate observations Global Vantage flags as firms that experience mergers during our sample period. In particular, we eliminate firm-year observations for which there is a disclosure of the acquisition method, and our results (not tabled) are virtually unchanged.

Second, we control for potential measurement error due to the omission of affiliate information. In some countries, parent companies are not required to account for their share of income from affiliates, and this creates measurement error in the *NI*, *ACC*, and *OCF* variables. To examine the robustness of our results to this measurement error we replicate our analysis for observations where Global Vantage specifically identifies whether a company's financial statements reflect consolidation. Unreported results using the reduced sample yield no change in inferences.

Third, our inferences are unaltered if we accumulate abnormal returns from two months after the filing deadline for various countries. Also, as with Fama and French (1998) and Alford et al. (1993), we consider accumulating returns six months after the fiscal year for all countries. Once again, our results are robust.

Finally, we split our sample into two subperiods, 1994–1997 and 1998–2002. We do this to assess whether the reported results are sensitive to time periods, and because Land and Lang (2003) report that EP ratios across many of the countries we examine converged in the second half of the 1990s, and the convergence was driven by the market's pricing of accruals, not operating cash flows. Results (unreported) yield similar inferences to those reported above on the occurrence or the lack thereof of the accrual anomaly in both subperiods.

Alternative Explanations for the Accrual Anomaly

We turn now to abnormal returns tests of alternative explanations that have been proposed in the literature for the accrual anomaly. We report detailed results of our investigation of two explanations below, and summarize our analysis of several others.

The first alternative explanation we consider is the possibility that the accrual anomaly is linked to earnings management. Xie (2001) demonstrates that the accrual anomaly in the U.S. is due mostly to the abnormal component of total accruals. Abnormal (or discretionary) accruals have been linked to earnings management in numerous studies (e.g., Dechow and Schrand 2004), and we consider whether the accrual anomaly is associated with abnormal accruals in a global setting. We hypothesize:

H2a: The accrual anomaly is due to earnings management.

To test H2a, we replace ACC^{dec} in Equation (6a) with Jones (1991) model discretionary accruals ($DACC^{dec}$) and nondiscretionary accruals ($NDACC^{dec}$), after transforming discretionary and nondiscretionary accruals into scaled-decile variables ranging from 0 to 1. Discretionary (i.e., abnormal) accruals are the difference between accruals and “expected” (or nondiscretionary) accruals, and we estimate nondiscretionary accruals by running the Jones (1991) model for each country-year:¹⁴

$$ACC_t = \alpha_1 + \alpha_2 \Delta REV_t + \alpha_3 PPE_t + \varepsilon \quad (7)$$

where ACC is accruals, REV is sales revenue (GVIC data 1), and PPE is gross property, plant, and equipment (GVIC data 77). The intercept and all variables are scaled by average total assets.¹⁵ The results are in Panel A of Table 7, and there is a reliably negative coefficient on $DACC^{dec}$ for Australia, Canada, the U.K., and the U.S., but this is not the case for nondiscretionary accruals. Hence, there is evidence that the accrual anomaly is related to earnings management in these four countries, which is consistent with Xie’s (2001) results for the U.S. We obtain virtually identical results using the modified-Jones model to estimate discretionary accruals.

Second, we consider whether the accrual anomaly is related to limits to arbitrage. Mashruwala et al. (2006) argue that absence of close substitutes for mispriced stocks accounts for why the accrual anomaly is not fully arbitrated away in U.S. markets. Pontiff (1996), Wurgler and Zhuravskaya (2002), and Mashruwala et al. (2006) use the idiosyncratic portion of a mispriced stock’s volatility that cannot be avoided by holding offsetting positions in other stocks and indexes as a proxy for the absence of close substitutes. Idiosyncratic risk is relevant to arbitrageurs in these papers because they assume that arbitrageurs are risk averse and highly specialized and, hence, hold relatively few positions at a time. Our hypothesis is:

H2b: The accrual anomaly is due to limits on arbitrage.

To control for arbitrage risk in our test of H2b, we interact ACC^{dec} with ARB^{dec} , where ARB^{dec} reflects idiosyncratic return volatility, the variable Mashruwala et al. (2006) use to proxy for absence of close substitute stocks for mispriced securities, which makes arbitrage more difficult. ARB^{dec} is our scaled-decile variable pertaining to arbitrage risk. A stock’s

¹⁴ There are insufficient data to estimate abnormal accruals on a country-industry-year basis.

¹⁵ If gross property, plant, and equipment is unavailable, we use net PPE (GVIC data 76).

arbitrage risk is the residual variance from a standard market model regression of its returns over the 36 months ending one month prior to the return accumulation period. We require a minimum of six observations to compute the residual variance, which reduces the sample to 60,695 observations. The results in Table 7, Panel B indicate there are no countries for which the coefficient on ACC^{dec} is reliably negative, and thus no case in which the accrual anomaly occurs once we control for barriers to arbitrage. In untabulated results, we also control for systematic risk by interacting ACC^{dec} with $BETA^{dec}$, where $BETA$ is computed from the market model regression described above, and our inferences are unaffected. Hence, we confirm the results in Mashruwala et al. (2006) for the U.S., and find their results generalize to other countries as well.

Additional Explanations

We also consider several other alternative explanations for the accrual anomaly, and find little support for each one. We briefly summarize our investigation of each of these.

First, Richardson et al. (2005) posit that some accrual components are measured more reliably than others, which can lead to differences in persistence across the components of

TABLE 7
Abnormal Returns Tests of Alternative Explanations for the Accrual Anomaly

Panel A: Regression Tests of Abnormal Returns on Discretionary Accruals, Following Xie (2001)

$$AR_{t+1} = \delta_0 + \delta_{1a}DACC^{dec}_t + \delta_{1b}NDACC^{dec}_t + \delta_2SIZE^{dec}_t + \delta_3EP^{dec}_t + \delta_4BM^{dec}_t + \delta_5OCF^{dec}_t + \varphi_{t+1} \quad (6b)$$

Country	n	$DACC^{dec}$	$NDACC^{dec}$	$SIZE^{dec}$	EP^{dec}	BM^{dec}	OCF^{dec}
Common Law Countries:							
Australia	1883	-0.129*	0.017	-0.127*	0.118	0.009	0.004
Canada	2816	-0.113^	-0.076^	-0.324**	0.146*	-0.215**	-0.041
Hong Kong	553	0.049	-0.160^	-0.081	0.086	0.155	0.081
India	1245	-0.041	0.084	-0.061	0.002	0.112	0.063
Hong Kong	553	0.049	-0.160^	-0.081	0.086	0.155	0.081
Singapore	1471	0.191**	0.211**	-0.103^	0.016	0.193**	0.301**
Thailand	1369	-0.048	0.017	-0.202**	0.162^	0.264*	0.205*
United Kingdom	6482	-0.087*	0.033	-0.145**	0.017	-0.065	0.016
United States	19039	-0.053*	0.046^	-0.292**	-0.089**	-0.040	0.135**
Code Law Countries:							
Denmark	504	0.038	0.028	0.163*	-0.016	0.141	0.166
France	2782	0.036	-0.024	0.053	0.057	0.049	0.151*
Germany	2483	-0.009	-0.131*	0.085*	0.150**	0.014	-0.021
Indonesia	839	0.156	0.487*	-0.203^	-0.245	0.449**	0.183
Italy	785	0.046	0.052	-0.051	0.039	0.139	0.216*
Japan	13822	-0.006	-0.014	0.031*	0.094**	0.134**	-0.004
Malaysia	2215	0.063	0.116**	-0.123**	0.021	0.122**	0.217**
The Netherlands	842	-0.015	0.043	0.017	0.051	0.009	0.066
Spain	678	0.013	0.158*	0.003	0.270**	0.023	-0.034
Sweden	777	0.046	-0.105	-0.071	0.099	-0.081	0.218*
Switzerland	815	-0.044	-0.053	-0.069	0.094	-0.134	-0.036
Taiwan	627	0.171*	0.062	-0.084	0.042	0.109	0.310**

(continued on next page)

TABLE 7 (Continued)

Panel B: Regression Tests of Abnormal Returns on Accruals after Controlling for Arbitrage Risk, Following Mashruwala et al. (2006)

$$AR_{t+1} = \delta_0 + \delta_1 ACC^{dec}_t + \delta_2 SIZE^{dec}_t + \delta_3 EP^{dec}_t + \delta_4 BM^{dec}_t + \delta_5 OCF^{dec}_t + \delta_6 ACC^{dec} * ARB^{dec}_t + \varphi_{t+1} \quad (6c)$$

Country	n	ACC^{dec}	$SIZE^{dec}$	EP^{dec}	BM^{dec}	$ACC^{dec} * ARB^{dec}$	OCF^{dec}
Common Law Countries:							
Australia	1858	-0.056	-0.201**	0.138	-0.029	-0.331**	-0.097
Canada	2791	0.047	-0.369**	0.071	-0.239**	-0.203*	0.026
Hong Kong	547	0.057	-0.129	0.085	0.125	-0.106	0.067
India	1226	0.025	-0.099	0.001	0.080	0.050	0.132
Malaysia	2174	0.079	-0.108**	0.041	0.142**	-0.063	0.181**
Singapore	1399	0.234*	-0.088	0.038	0.164**	-0.039	0.276**
Thailand	1369	-0.065	-0.179*	0.208*	0.258**	0.108	0.153
United Kingdom	6425	-0.046	-0.158**	0.021	-0.096*	-0.109*	-0.020
United States	18618	0.048	-0.280**	-0.093**	-0.054**	-0.050*	0.013**
Code Law Countries:							
Denmark	470	0.045	0.247**	-0.047	0.236*	0.059	0.193
France	2653	0.069	0.073*	0.063	0.079	-0.201**	0.100^
Germany	2394	0.189**	0.037	0.083*	0.017	-0.287**	0.095^
Indonesia	832	0.211	-0.131	-0.267	0.403*	0.145	0.252
Italy	745	0.093	-0.060	0.027	0.124	-0.058	0.213*
Japan	13600	0.003	0.016	0.090**	0.114**	-0.131**	-0.013
The Netherlands	819	0.101	0.002	0.006	0.018	-0.033	0.134^
Spain	665	0.170*	-0.013	0.245**	0.011	-0.228*	-0.013
Sweden	692	0.216*	-0.150*	0.049	-0.086	-0.217^	0.301
Switzerland	798	-0.000	-0.068	0.053	-0.081	-0.108	0.012
Taiwan	620	0.204*	-0.077	0.021	0.156	0.052	0.360**

**, *, ^ Represents statistical significance of t-statistics at 1 percent, 5 percent, and 10 percent levels, respectively, one- (two-) tailed for ACC^{dec} and OCF^{dec} (other variables). We estimate the models in Table 7 using the Generalized Method of Moments procedure with Newey and West (1987) correction for autocorrelation for one lag.

Sample consists of 62,027 firm-year observations from 1994–2002 (sample is reduced to 60,695 observations for Panel B due to lack of available arbitrage risk proxy).

NI is the decile rank related to net income before extraordinary items (GVIC data 32) scaled by average total assets measured as the average of beginning and end of fiscal year total assets (GVIC data 89). Operating cash flows is net income before extraordinary items plus Depreciation (GVIC data 11) minus change in Current assets (GVIC data 75 minus GVIC data 60) and plus change in Current liabilities (GVIC data 104 minus data 94). Accruals is NI minus OCF , while ACC^{dec} refers to the decile rank of accruals scaled by average total assets. $SIZE^{dec}$ is market value of common equity measured in a country's own currency at the beginning of the return accumulation period, then ranked within the country, and transformed to a scaled-decile variable ranging from 0 to 1. Thus currency translation issues do not pose a concern for our analysis; EP^{dec} is earnings-to-price ratio (stock price measured at the beginning of the return accumulation period), transformed to a scaled-decile variable ranging from 0 to 1; BM^{dec} is the natural logarithm of the ratio of the book-to-market ratio measured at the beginning of the abnormal return accumulation period, transformed to a scaled-decile variable ranging from 0 to 1. Abnormal return (AR) is the annual holding period return, including dividends, minus the appropriate country index compiled by the investment bank Morgan Stanley (<http://www.msci.com>); $DACC^{dec}$ ($NDACC^{dec}$) is the decile rank of discretionary (nondiscretionary) accruals scaled by average total assets. Discretionary accruals are estimated using the Jones (1991) model described in the text to estimate expected (or nondiscretionary) accruals; ARB^{dec} is scaled-decile variable pertaining to arbitrage risk. A stock's arbitrage risk is the residual variance from a standard market model regression of its returns over the 36 months ending one month prior to the return accumulation period.

total accruals. This suggests that differential abnormal returns will be associated with trading strategies based on the differing reliabilities of the various accrual components.

In untabulated results, we first (1) replicate Richardson et al.'s (2005) results that current period total accruals is negatively related to next period's return on assets, and this occurs in Australia, Canada, the U.K., as well as the U.S.; (2) confirm the significance of most of the components of total accruals that Richardson et al. (2005) find are related to next period's return on assets for the U.S.; but (3) find that only changes in current liabilities and changes in noncurrent assets are consistently significant across Australia, Canada, and the U.K. We then perform abnormal returns tests following Richardson et al. (2005). Our results indicate the following: (1) Significantly negative coefficients for the U.S., indicating abnormal returns can be earned on changes in the following accrual components: current assets, current liabilities, and non-current assets. These results are broadly consistent with those of Richardson et al. (2005) for the U.S., except they find that abnormal returns can also be earned on long-term investments. (2) We also observe that changes in current liabilities and changes in noncurrent assets are significant in Australia and the U.K., but not Canada. These results suggest that mispricing of less reliably measured accrual components is only a partial explanation of the accrual anomaly worldwide.

Second, we examine whether the anomaly is an aspect of the value-growth (a.k.a. value-glamour) anomaly the finance literature has documented worldwide (Fama and French 1998). Desai et al. (2004) show that the accrual anomaly and the value-glamour anomaly (attributed to sales growth, book-to-market, and earnings-to-price) are captured by returns to a new variable, operating cash flow-to-stock price, in the U.S. We note that consideration of cash flow-to-stock price reflects a combination of valuation anomalies and earnings quality issues that are proxied by accruals.

To test whether the value-glamour anomaly subsumes the accrual anomaly, we augment Equation (6) with decile ranks of operating cash flows scaled by stock price ($OCFP^{dec}$). We find in untabulated results that the coefficient on ACC^{dec} for the U.S. is insignificant whereas the coefficient on $OCFP^{dec}$ is significantly positive. Thus, as in Desai et al. (2004), we do not detect the accrual anomaly when controlling for operating cash flows deflated by stock price. However, this result does not generalize. We find a significantly negative coefficient on ACC^{dec} for Australia, Canada, and the U.K., and the accompanying coefficient on $OCFP^{dec}$ is not significantly positive for these countries. Hence, the value-glamour anomaly does not subsume the accrual anomaly in Australia, Canada, and the U.K., but it appears to do so in the U.S.

Finally, Khan (2005) alludes to the role of bankruptcy risk in explaining the accrual anomaly such that low accruals proxy for firms with high risk of bankruptcy. When we control for bankruptcy risk in untabulated results the coefficient on ACC^{dec} remains significantly negative in Australia, Canada, the U.K., and the U.S., consistent with our main results and inconsistent with bankruptcy risk explaining the accrual anomaly.

In summary, we document that the accrual anomaly occurs in Australia, Canada, the U.K., and the U.S. We consider several alternative explanations for the accrual anomaly, and find that (1) the accrual anomaly reflects abnormal (or discretionary) accruals, and (2) we no longer observe the accrual anomaly when we control for limits to arbitrage. The results suggest that earnings management by means of accrual manipulation is a key factor explaining the presence of the accrual anomaly, and that limits to arbitrage, which implies that impediments to the rational pricing of accruals are costly to remove, is key in explaining why the anomaly persists.

V. ANALYSIS OF ADRs

In our final analysis, we explore whether the accrual anomaly occurs when we place firms from countries where we do not observe the anomaly into the context of the U.S. capital markets. We consider a sample of American Depositary Receipts (ADRs), which are certificates representing an interest in the shares of a foreign-based company that are traded in the U.S. A significant advantage of examining ADRs is that these cross-listed firms are subjected to the institutional requirements in the U.S., including increased SEC-mandated disclosure and enforcement and generally increased monitoring and litigation (e.g., Coffee 2002). Thus, we examine a setting where stocks of firms domiciled in countries where it is least likely to observe the accrual anomaly, trade (cross-list) in the U.S., which has institutional and accounting features associated with the occurrence of the anomaly.

We obtain ADR data for 893 firm-years for 1994–2002 from CRSP and Compustat consisting of firms that are domiciled in 14 of the 16 countries where the accrual anomaly was nonexistent. No ADR data are available for firms from Malaysia and Thailand. Table 8, Panel A lists the firm-years from each of the countries included in the ADR sample. Approximately 22 percent of the ADR firm-years are from Japan, 21 percent from The Netherlands, and 16 percent from France.

Panel B of Table 8 presents the results of the Mishkin test. There is significant over-weighting of accruals (1.763 versus 0.438), similar to the result for U.S. companies in Table 3, Panel C. Hence, even though we have excluded firms that are from countries where we documented the occurrence of the accrual anomaly (i.e., Australia, Canada, the U.K., and the U.S.), when we examine ADRs from countries where we do not observe the accrual anomaly, the Mishkin test rejects the null hypothesis of rational pricing of accruals. The results for the abnormal returns test appear in Table 8, Panel C, and are consistent with the Mishkin test results. The coefficient of ACC^{dec} is reliably negative (-0.041) when we estimate Equation (6) using ADRs, and remains so (-0.029) when we control for OCF .¹⁶

In summary, the results suggest that ADRs of firms from countries where the accrual anomaly is not prevalent, and which likely make additional financial disclosures by having ADRs traded, nevertheless reflect the accrual anomaly. This is an intriguing result suggesting that the accounting and institutional structures of a country where a firm's stock is traded can matter more than those features of the country where a firm is domiciled. The descriptive data in Table 4 indicate that the U.S. is characterized by three of the four accounting and institutional structures that we document in Table 5, Panel B as being significantly linked to the occurrence of the accrual anomaly; these are a common law tradition, the most highly dispersed share ownership of any of the 20 countries we consider, and the most extensive use of accrual accounting permitted of any country we consider. Thus, the ADR analysis is consistent with these features having a significant bearing on the efficiency with which stock market participants interpret the accrual component of earnings.

VI. SUMMARY, DISCUSSION, AND CONCLUSIONS

In addition to the post-earnings announcement drift (e.g., Bernard and Thomas 1990), the accrual anomaly (Sloan 1996) represents an important challenge to the widely held belief that U.S. stock markets are efficient with respect to publicly available accounting information.¹⁷ We investigate whether the evidence related to the accrual anomaly is specific

¹⁶ Due to small country-specific sample sizes in the ADR sample, we do not perform country-specific analyses.

¹⁷ See Fama (1991, 1998), Kothari (2001), and Lee (2001) for recent surveys of capital market anomalies that researchers in finance and accounting have documented.

to the U.S. market. Analyses of samples from the markets of 19 other countries suggest that the accrual anomaly, characterized by stock markets overweighting accrual persistence, is present in only four countries: Australia, Canada, the U.K., and the U.S. We also find that an underweighting of operating cash flows generally does not accompany the overweighting of accruals. However, we find considerable evidence of an underweighting of operating cash flows and earnings in other countries.

TABLE 8
Regression Results for ADR Sample

Panel A: Country Composition of Firms Traded as ADRs in the U.S. Markets

<u>Country</u>	<u>No. of Firms</u>
Denmark	27
France	146
Germany	61
Hong Kong	28
India	8
Indonesia	20
Italy	71
Japan	199
Malaysia	0
The Netherlands	186
Singapore	25
Spain	20
Sweden	57
Switzerland	36
Taiwan	9
Thailand	0
Total	893

Panel B: Regression Results Related to Capital Market Weighting of Accrual and Cash Components Using Mishkin (1983) Framework for the ADR Sample

$$NI_{t+1} = \gamma_0 + \gamma_1 ACC_t + \gamma_2 OCF_t + \varepsilon_{t+1} \quad (1)$$

$$AR_{t+1} = \beta_0 + \beta_1(NI_{t+1} - \gamma_0^* - \gamma_1^* ACC_t - \gamma_2^* OCF_t) + \nu_{t+1} \quad (2)$$

<u>n</u>	<u>β_1</u>	<u>γ_1</u>	<u>γ_1^*</u>	<u>γ_2</u>	<u>γ_2^*</u>	<u>F-statistic for $\gamma_1 = \gamma_1^*$</u>	<u>F-statistic for $\gamma_2 = \gamma_2^*$</u>
893	1.893	0.438	1.763	0.731	1.121	21.03**	2.92^

Panel C: Regression Tests of Abnormal Returns on Accruals

$$AR_{t+1} = \delta_0 + \delta_1 ACC^{dec}_t + \delta_2 SIZE^{dec}_t + \delta_3 EP^{dec}_t + \delta_4 BM^{dec}_t + \delta_5 OCF^{dec}_t + \varphi_{t+1} \quad (6a)$$

<u>n</u>	<u>ACC^{dec}</u>	<u>$SIZE^{dec}$</u>	<u>EP^{dec}</u>	<u>BM^{dec}</u>	<u>OCF^{dec}</u>
893	-0.041**	-0.042**	-0.007	-0.039**	
893	-0.029*	-0.040**	-0.006	-0.041**	-0.003

(continued on next page)

TABLE 8 (Continued)

**, *, ^ Represents statistical significance of t-statistics (F-statistics) at 1 percent, 5 percent, and 10 percent levels, respectively, two- (one-) tailed for Panel B (Panel C).

The ADR sample consists of 893 firm-year observations over the period 1994–2002.

NI is income before extraordinary items (COMPUSTAT data 18) scaled by average total assets measured as the average of beginning and end of fiscal year total assets (COMPUSTAT data 6). *OCF* is operating cash flows (COMPUSTAT data 308 minus data 124) scaled by average total assets. *ACC* is accruals measured as *NI* minus *OCF*. Abnormal return (*AR*) is annual holding period return, including dividends, minus the value weighted market return.

Additional variables for Panel C are defined as follows: Superscript *dec* indicates a transformation of the respective variable to a scaled-decile variable ranging from 0 to 1. *SIZE* is the market value of common equity at the beginning of the abnormal return accumulation period, *EP* is earnings-to-price ratio (stock price measured at the beginning of the abnormal return accumulation period), *BM* is the natural logarithm of the book-to-market ratio measured at the beginning of the abnormal return accumulation period.

We consider a number of alternative explanations for the accrual anomaly, and our results are most supportive of the earnings management and limits to arbitrage explanations. It appears that earnings management using accruals is key to the occurrence of the accrual anomaly, and barriers to arbitrage due to the absence of close substitutes for mispriced stocks explains why it persists. We also explore the extent to which country-level accounting and institutional factors are useful in understanding why the accrual anomaly occurs in some countries but not in others. We find the anomaly is more likely to occur in countries with a common law legal tradition, more extensive accrual accounting, lower concentration of share ownership, and possibly weaker outside shareholder rights. Moreover, we examine ADRs of firms from countries in our sample for which we do not observe the accrual anomaly. The results indicate the presence of the accrual anomaly when we consider firms domiciled outside the U.S. but list in the U.S. ADR market. This buttresses our findings that common law tradition, extensive accrual accounting, and disperse share ownership are significant with regard to the occurrence of the anomaly.

It is undoubtedly surprising that we observe the accrual anomaly in countries where the capital markets are considered most efficient. One possible reason for this is that there is more focus on earnings in these markets than in most of the other markets we examine, and our finding in support of earnings management using accruals as a key explanation for the accrual anomaly is consistent with capital market agents in aggregate not fully seeing through earnings to the underlying economic fundamentals. It may be the accrual anomaly has a behavioral cause, but our findings that investors price accruals and operating cash flows differently (even as they overweight accruals) is inconsistent with a naïve version of the functional fixation hypothesis. It is also the case that there is incomplete disclosure about the accrual components of earnings, which increases information asymmetry between managers and investors, a necessary condition for earnings management.

Another surprising result is that operating cash flows are not underweighted in Australia, Canada, the U.K., and the U.S., but *OCFs* are underweighted in a large number of other countries where accruals are not overweighted. We conjecture the underweighting of *OCFs* in these countries may reflect the belief by investors that earnings management occurs in these countries through the structuring of transactions (e.g., Jian and Wong 2004) rather than the manipulation of accruals. Moreover, to the extent the relation between stock prices and underlying economic fundamentals is weaker in less efficient markets, investors in such markets may have less confidence that what is being reported actually captures the underlying fundamentals. If insiders also have more control over resources and reporting, then

it may be that such nonfundamentals are the more important determinants of value in such markets. We leave an investigation of *OCF* underweighting to future research.

Although cross-country research designs such as the ones we employ exploit differences in financial reporting and institutional and corporate governance structures to provide new evidence on a phenomenon, they suffer from several limitations. For example, Bushman and Smith (2001) indicate that the use of cross-country designs in studies like ours provides primarily descriptive evidence as causal theories to explain that the phenomena are problematic at best. Nevertheless, our findings should provide useful input in developing richer theories and additional empirical analyses that will further advance our understanding of the accrual anomaly.

REFERENCES

- Alford, A., J. Jones, R. Leftwich, and M. Zmijewski. 1993. The relative informativeness of accounting disclosures in different countries. *Journal of Accounting Research* 31 (Supplement): 183–223.
- Ali, A., and L. Hwang. 2000. Country-specific factors related to financial reporting and the value relevance of accounting data. *Journal of Accounting Research* 38 (1): 1–21.
- Ashbaugh, H., and M. Pincus. 2001. Domestic accounting standards, International Accounting Standards, and the predictability of earnings. *Journal of Accounting Research* 39 (3): 417–434.
- Ball, R., S. P. Kothari, and A. Robin. 2000. The effect of institutional factors on properties of accounting earnings. *Journal of Accounting and Economics* 29 (1): 1–51.
- Belsley, D., E. Kuh, and R. Welsch. 1980. *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*. New York, NY: Wiley.
- Beneish, M., and M. Vargus. 2002. Insider trading, earnings quality, and accrual mispricing. *The Accounting Review* 77 (October): 755–791.
- Bernard, V., and J. Thomas. 1990. Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics* 13: 305–340.
- Bhattacharya, U., and H. Daouk. 2002. The world price of insider trading. *Journal of Finance* 57: 75–108.
- , ———, and M. Welker. 2003. The world price of earnings opacity. *The Accounting Review* 78: 641–678.
- Bradshaw, M., S. Richardson, and R. Sloan. 2001. Do analysts and auditors use information in accruals? *Journal of Accounting Research* 39: 45–74.
- Bushman, R., and A. Smith. 2001. Financial accounting information and corporate governance. *Journal of Accounting and Economics* 32: 237–333.
- , and J. Piotroski. 2004. Financial reporting incentives for conservative accounting: The influence of legal and political institutions. Working paper, University of North Carolina.
- Coffee, J. 2002. Racing towards the top? The impact of cross-listings and stock market competition on international corporate governance. Working paper, Columbia Law School.
- Collins, D. W., and P. Hribar. 2000. Earnings-based and accrual-based market anomalies: One effect or two? *Journal of Accounting and Economics* 29: 101–124.
- Coopers & Lybrand. 1993. *International Accounting Summaries: A Guide for Interpretation and Comparison*. 2nd Edition. New York, NY: Wiley.
- Davis, J. 1994. The cross-section of realized returns: The pre-Compustat evidence. *Journal of Finance* 49: 1579–1593.
- Dechow, P., and C. Schrand. 2004. *Earnings Quality*. Charlottesville, VA: Research Foundation of CFA Institute.
- Desai, H., S. Rajgopal, and M. Venkatachalam. 2004. Value-glamour and accruals mispricing: One anomaly or two? *The Accounting Review* 79: 355–385.
- Fama, E., and J. MacBeth. 1973. Risk, return and equilibrium: Empirical tests. *Journal of Political Economy* 71 (May/June): 607–636.
- . 1991. Efficient markets: II. *Journal of Finance* 46: 1575–1617.

- . 1998. Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics* 49: 283–306.
- , and K. French. 1998. Value versus growth: The international evidence. *Journal of Finance* 53: 1975–1999.
- Greene, W. 1993. *Econometric Analysis*. 2nd edition. New York, NY: McMillan.
- Holthausen, R. W. 2003. Testing the relative power of accounting standards versus incentives and other institutional features to influence the outcome of financial reporting in an international setting. *Journal of Accounting and Economics* 36: 271–283.
- Houge, T., and T. Loughran. 2000. Cash flow is king: Cognitive errors by investors. *Journal of Psychology and Financial Markets* 2 (1): 161–175.
- Hribar, P. and D. Collins. 2002. Errors in estimating accruals: Implications for empirical research. *Journal of Accounting Research* 40 (1): 105–134.
- Hung, M. 2001. Accounting standards and value relevance of financial statements: An international analysis. *Journal of Accounting and Economics* 30: 401–420.
- Jian, M., and T. J. Wong. 2004. Earnings management and tunneling through structuring-related party transactions: Evidence from Chinese corporate groups. Working paper, Chinese University of Hong Kong.
- Johnston, J. 1984. *Econometric Methods*. 3rd edition. New York, NY: McGraw-Hill Publishing Company.
- Jones, J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (2): 193–228.
- Khan, M. 2005. Are accruals really mispriced? Evidence from tests of an intertemporal capital asset pricing model. Working paper, University of Toronto.
- Kothari, S. P. 2001. Capital markets research in accounting. *Journal of Accounting & Economics* 31 (1–): 105–231.
- LaFond, R. 2005. Is the accrual anomaly a global anomaly? Working paper, Massachusetts Institute of Technology.
- Land, J., and M. Lang. 2003. Empirical evidence on the evolution of international earnings. *The Accounting Review* 77: 115–133.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1997. Legal determinants of external finance. *Journal of Finance* 52: 1131–1150.
- , ———, and ———. 1998. Law and finance. *Journal of Political Economy* 106: 1113–1155.
- Lee, C. 2001. Market efficiency and accounting research: A discussion of “Capital market research in accounting” by S. P. Kothari. *Journal of Accounting & Economics* 31 (1–3): 233–253.
- Leuz, C., D. J. Nanda, and P. Wysocki. 2003. Earnings management and institutional factors: An international comparison. *Journal of Financial Economics* 69 (3): 505–527.
- Mashruwala, C., S. Rajgopal, and T. Shevlin. 2006. Why is the accrual anomaly not arbitrated away? The role of idiosyncratic risk and transaction costs. *Journal of Accounting and Economics* 42 (1–2): 3–33.
- Mishkin, F. 1983. *A Rational Expectations Approach to Macroeconometrics: Testing Policy Ineffectiveness and Efficient-Markets Models*. Chicago, IL: University of Chicago Press.
- Newey, W. K., and K. D. West. 1987. A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica* 55 (3): 703–708.
- Pontiff, J. 1996. Costly arbitrage: Evidence from closed-end funds. *The Quarterly Journal of Economics* 111 (4): 1135–1151.
- . 2006. Costly arbitrage and the myth of idiosyncratic risk. *Journal of Accounting and Economics* 42 (1–2): 35–52.
- Richardson, S., R. Sloan, M. Soliman, and I. Tuna. 2005. Accrual reliability, earnings persistence and stock prices. *Journal of Accounting and Economics* 39 (3): 437–485.
- Sloan, R. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review* 71: 289–315.

- Warfield, T., J. Wild, and K. Wild. 1995. Managerial ownership, accounting choices, and informativeness of earnings. *Journal of Accounting and Economics* 20 (1): 61–91.
- Wurgler, J., and E. Zhuravskaya. 2002. Does arbitrage flatten the demand curve for stocks? *Journal of Business* 74 (4): 583–608.
- Xie, H. 2001. The mispricing of abnormal accruals. *The Accounting Review* 76 (3): 357–373.
- Zach, T. 2003. Inside the “accrual anomaly.” Working paper, Washington University in St. Louis.

GASB No. 34's Governmental Financial Reporting Model: Evidence on Its Information Relevance

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ABSTRACT: This study uses a sample of 530 Texas school districts to investigate the information relevance of governmental financial statements published under Governmental Accounting Standards Board Statement No. 34 (GASB No. 34). Specifically, we examine whether the new government-wide statements provide information relevant for assessing a government's default risk, and if this information is incremental to that provided by the governmental funds statements. GASB No. 34 requires governments to publish governmental funds statements prepared on a modified accrual basis, and government-wide statements prepared on an accrual basis. We find that GASB No. 34's *Statement of Net Assets* (similar to a corporation's balance sheet) provides information relevant for assessing default risk, and this information is incremental to that provided by the governmental funds statements. However, GASB No. 34's *Statement of Activities* (similar to a corporation's income statement) does not provide information relevant for assessing default risk. The accrual "earnings" measure is *not* more informative than the modified-accrual "earnings" measure. A government's modified-accrual earnings measure can be thought of as a type of measure of changes in working capital. Therefore, our results are consistent with research on corporate entities that attributes the superiority of earnings over cash flows primarily to working capital accruals and not long-term accruals. For our sample of school districts, evidence suggests that total net assets from the government-wide *Statement of Net Assets*, along

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with a measure of modified-accrual "earnings" from the governmental funds statement, provide the best information for explaining default risk.

Keywords: GASB; governmental accounting; accrual accounting; municipal bonds; default risk.

Data Availability: Data are publicly available from the sources identified in the text.

I. INTRODUCTION

The Governmental Accounting Standards Board (GASB) in June 1999 issued GASB Statement No. 34, *Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments* (GASB No. 34). GASB No. 34 presents a new governmental financial reporting model that for the first time requires state and local governments to present consolidated government-wide financial statements prepared on an accrual basis. This change moves governmental reporting closer to corporate financial reporting. Upon its release, the GASB Chairman characterized GASB No. 34 as "the most significant change in the history of governmental accounting" (GASB 1999a).

Our study investigates whether the new accrual-basis statements are relevant for assessing a government's default risk, and if this information is incremental to that provided by the contemporaneously published governmental funds statements. These questions are important for at least two related reasons. First, the GASB believes that the new financial reporting model will substantially increase the value of governmental financial reports by providing users with a more complete understanding of a government's financial position (GASB 1999b). Our study is the first to provide empirical evidence on the usefulness of the new government-wide statements for evaluating a government's default risk. Second, the GASB is charged with establishing standards only when the expected benefits exceed the perceived costs (GASB 1987, para. 28; GASB 2005, para. 73). Opponents of GASB No. 34 argue that the new standard is costly to implement and monitor, especially when the corresponding benefits are uncertain (Copley et al. 1997). Thus, evidence on the informativeness of the new government-wide statements relative to the governmental funds statements is important in assessing GASB No. 34's possible benefits.

Prior to GASB No. 34, state and local governments were required to present information for various fund types, including "governmental funds." Governmental funds are used to account for most government functions and are generally the most important funds for government entities, particularly for school districts. GASB No. 34 requires that governments continue to provide governmental funds statements. Governmental funds statements are prepared using the modified accrual basis of accounting and a "current financial resources" measurement focus. They do not report depreciation expense or longer-term accruals, and do not report capital assets or long-term liabilities. As a result, these statements focus on a government's fiscal accountability, budgetary compliance, and short-term financial health (GASB 1999b, Overview).

In addition to the governmental funds statements, GASB No. 34 requires governments to publish two government-wide statements: the *Statement of Activities* (similar to a corporate income statement) and the *Statement of Net Assets* (similar to a corporate balance sheet). These statements are prepared using accrual accounting for all of the government's activities. The *Statement of Activities* reports all revenues and all costs of providing government services during the year, including items such as accrued interest expense and depreciation expense. The *Statement of Net Assets* reports not only current financial assets and liabilities, as would be reported in governmental funds statements, but also capital assets and long-term liabilities. The GASB believes these new statements will provide users

with "information about the probable *medium- and long-term effects* of past decisions on the government's financial position and financial condition" (GASB 1999b, para. 219) (emphasis in the original).¹

To provide evidence on the information relevance of the new government-wide statements, we examine the association between a school district's default risk and accounting variables constructed from the new statements. Our sample consists of 530 Texas school districts. Although GASB No. 34's implementation date depended on a government's size, the Texas Education Agency required full implementation of GASB No. 34 by all Texas school districts (regardless of size) for the fiscal year beginning September 1, 2001. This inclusive adoption provides a large, homogeneous sample of governments that all implemented GASB No. 34 in the same year.² We use a district's underlying debt rating as our measure of default risk because, like the majority of municipal bonds, almost all bonds for Texas school districts are insured. Accordingly, the bond's rating and market yield reflect the insurer's default risk (AAA) rather than the school district's. Underlying debt ratings are a rating agency's assessment of a particular debt issue's credit quality absent credit enhancement. Evidence suggests that rating agencies are among the primary users of governmental accounting information, and bond investors rely on these rating agencies to assess default risk (Ingram et al. 1989; Wilson and Kattelus 2001). Therefore, this study focuses on an important group in the governmental sector.

Our empirical tests evaluate several accounting variables constructed from the governmental activities section of the government-wide statements, including: total net assets (a measure of financial position), revenues minus expenses (a measure of financial performance), and current liabilities. We also examine the separate components of total net assets, including invested in capital—net of related debt, restricted net assets, and unrestricted net assets. We find that total net assets and each of its components provide relevant information for assessing a school district's underlying debt rating. This suggests that accrual-based measures of financial position reported on the *Statement of Net Assets* are informative about default risk. However, we find no evidence that the government-wide measure of financial performance or current liabilities are associated with underlying debt ratings.³

We then examine whether the accrual-basis statements provide information that is incremental to that provided by the contemporaneously published funds statements. In sum, results suggest that total net assets is the only government-wide measure that provides

¹ GASB No. 34 introduced other new requirements, including a management's discussion and analysis and certain supplementary information. In this study, we focus on the government-wide statements because they are considered to be the most significant element of GASB No. 34 (Klasny and Williams 2000, 1; Kravchuk and Voorhees 2001, 6; Wilson and Kattelus 2001, 50; Chaney and Copley 2002, 26; Reck et al. 2004).

² Using Texas school districts provides several benefits. First, there are several features of the Texas education system that help ensure data reliability and uniform reporting across school districts. The Texas Education Agency (TEA) requires that all school districts publish audited financial statements, prepared in accordance with GAAP. The TEA closely monitors school districts' financial reporting and requires that all school districts electronically submit their financial statement information to TEA in a uniform manner. The TEA uses this information to help allocate \$12.3 billion of state funding (FYE 2005) and redistribute local tax collections between wealthy and poor districts. Second, using a within-state sample helps ensure that our results are not confounded by differences across states (Apostolou et al. 1985). Third, in part due to these advantages, Texas school districts are widely used in the economics literature (Hsueh and Kidwell 1988; Gist 1992; Cullen 2003), and in prior accounting studies (Deis and Giroux 1992; Strand et al. 1999; Banker et al. 2004). This increases our general knowledge about the sample.

³ We limit our analysis of government-wide statements to governmental activities and do not examine business-type activities. Business-type activities for school districts are extremely rare and generally immaterial when they do occur. Only 81 of the 1,033 Texas school districts had business activities. For these districts, mean (median) business revenues comprise less than 2 percent (1 percent) of total revenues, and mean and median business assets comprise less than 1 percent of total assets.

information incremental to that provided by the governmental funds statements. The accrual-based "earnings" measure (revenues minus expenses) and current liabilities do not provide incremental information. Overall, our results suggest that an accrual-based measure of total net assets from the government-wide statements, along with a modified-accrual measure of "earnings" from the governmental funds statement, provide the best information for explaining a district's underlying debt rating.

This study makes several contributions to the accounting literature. First, it contributes to the governmental accounting literature by examining the relevance of accrual accounting measures for government entities. An increasing number of countries have moved toward requiring governments to report financial statements prepared on an accrual basis.⁴ However, critics argue that governments and businesses differ in fundamental ways, and the benefits of accrual accounting that arise in the private sector may not apply in the public sector (Barton 2005). Our results extend our understanding of accrual accounting's relative benefits in the governmental sector.

This study also complements corporate-sector studies that examine the informativeness of earnings relative to cash flows. Research on corporate entities finds that accrual-based earnings are a better measure of firm performance than cash flows, and that the relative superiority of earnings over cash flows is largely due to working capital accruals and not long-term accruals (Dechow 1994; Dechow et al. 1998; Dechow and Dichev 2002). In our governmental setting, we find that accrual-based "earnings" (revenues minus expenses) are *not* more informative than modified accrual-based earnings. The governmental funds statements are based on a modified version of a working capital model that emphasizes expendable available financial resources. Revenues minus expenditures can be thought of as a type of measure of changes in working capital, which is based on changes in current financial assets and claims against those assets (fund liabilities). Our evidence suggests that, after controlling for working capital accruals, additional accruals are not incrementally informative for our sample of school districts. Our results are also consistent with Ball and Shivakumar (2005) who provide evidence that the market's demand for financial statements affects financial statement quality. If demand for governmental financial statements is low, and if lower demand results in lower quality, then accrual-basis statements are not likely to provide additional information over the funds statements.

The state and local government sector is important to study because of its economic and social significance. State and local government expenditures represent approximately 20 percent of the U.S. gross domestic product (\$2.0 trillion of \$10.5 trillion in 2002).⁵ For FYE 2002, local government expenditures totaled \$1.13 trillion, with \$407 billion of that amount (36 percent) spent on elementary and secondary education. Average school spending on current operations exceeds \$7,700 per pupil in the U.S. and dwarfs any other category of local government spending (U.S. Census Bureau 2002a, 2002b). School district debt also represents a significant portion of the municipal bond market. As of FYE 2002, long-term debt outstanding for all local governments in the U.S. totaled \$1.02 trillion, with \$232

⁴ These countries include the U.S., Australia, Canada, the United Kingdom, New Zealand, Sweden, and Spain (Barton 2005; IFAC 1996). The International Federation of Accountants (IFAC) publishes the *International Public Sector Accounting Standards*. In these standards, IFAC prescribes that a government's financial statements be prepared under the accrual basis of accounting (IFAC 2006b), and encourages all governments to "progress to the accrual basis of accounting" if they still report on a cash basis (IFAC 2006a, 588).

⁵ The 2002 government census shows 87,525 local government units, consisting of 3,034 counties; 19,429 municipalities; 16,504 towns and townships; 13,506 independent school districts; and 35,052 special district governments. For school districts, Texas represents 1,034 (7.5 percent) of those noted in this census. Texas school district expenditures for FYE 2002 totaled approximately \$31.6 billion, and long-term debt outstanding totaled over \$28 billion (12 percent of the U.S. total) (U.S. Census Bureau 2002a).

billion (23 percent) of that amount issued for elementary and secondary education purposes. Given today's rising enrollments, pressures for increased spending, and the burden of meeting new federal guidelines (e.g., No Child Left Behind Act of 2001), the school district segment of local governments will likely become even more significant in future years.

The remainder of this study is organized as follows. Section II discusses GASB No. 34 reporting and develops the hypotheses. Section III describes the variables and sample. Section IV discusses the study's empirical methods and results. Section V provides concluding remarks.

II. HYPOTHESIS DEVELOPMENT

GASB No. 34's Government-Wide Statements

Under GASB No. 34, state and local governments generally report two government-wide statements: a *Statement of Net Assets* and a *Statement of Activities*, and two governmental funds statements: a *Balance Sheet* and a *Statement of Revenues, Expenditures, and Changes in Fund Balance* (hereafter, *Statement of Changes*). The Appendix provides an example of these statements for an independent school district in Texas.⁶ The governmental funds statements are prepared using a "current financial resources" measurement focus and a modified accrual basis of accounting. Conceptually, governmental fund accounting focuses on current assets and current liabilities. However, this definition of "current" is more restrictive for governmental fund reporting than for corporate reporting, which typically uses a 12-month window to classify items as current.⁷ Consequently, governmental funds statements provide information on the government's fiscal accountability, including its management and control of short-term financial resources and its compliance with budgetary and legal requirements (GASB 1999b, paras. 203 and 235). The funds statements do not provide information about a government's long-term financial condition or the full costs of providing goods and services due to their short-term focus (GASB 1999b, Overview).

In contrast, the government-wide statements are prepared using an "economic resources" measurement focus and an accrual basis of accounting. The *Statement of Net Assets* includes current assets and liabilities, where "current" refers to a 12-month window and is a more expansive definition than under fund reporting. For example, the *Statement of Net Assets* includes accrued interest payable on long-term debt, whereas the governmental funds *Balance Sheet* does not. The *Statement of Net Assets* also includes long-term assets and liabilities such as capital assets, infrastructure, and general obligation debt.

Because the government-wide statements are prepared using accrual accounting, the *Statement of Activities* reports all revenues and costs of providing government services during the year, not just those received or paid in the current year or soon thereafter (GASB 1999b, Preface). This means that depreciation expense and accrued interest expense are reported on this statement. The government-wide statements focus on operational accountability, defined as the extent to which a government is meeting its operating objectives, using all available resources, and whether a government can continue to meet its objectives

⁶ We modified the financial statements by omitting the school district's name and deleting the line reference numbers. GASB No. 34 also requires governments to provide two reconciliation statements: one that reconciles "total fund balance" (from the *Balance Sheet*) with "total net assets" of governmental activities (from the *Statement of Net Assets*), and one that reconciles change in fund balance (from the *Statement of Changes*) with change in net assets of governmental activities (from the *Statement of Activities*).

⁷ For governmental funds, current assets are financial resources, and current liabilities are unpaid claims that are expected to be liquidated from current financial resources or will result in the creation of other current liabilities. On the *Statement of Changes*, revenue is recognized in the year it is both measurable and available to finance expenditures (including resources expected to be collected shortly after year-end), and if measurable, expenditures are recognized in the year that a related liability is incurred (GASB 1999b).

for the foreseeable future (GASB 1999b, para. 203). The GASB believes the government-wide statements will help users assess a government's medium- and long-term financial health (GASB 1999b, paras. 219 and 220).

There are several reasons why the accrual-basis statements are likely to be more relevant than the funds statements. First, relative to expenditures on a modified accrual basis, accrued expenses reported on the *Statement of Activities* should provide a better measure of the economic costs of providing government services and whether a government's revenues are sufficient to cover its operating costs (GASB 1999b, Preface and paras. 225–227). Although a government can borrow or draw down its current assets to cover expenditures in the short-run, insufficient revenues suggest that a government will likely have to increase taxes or decrease services in the future. These actions can depress property values and deter investment, thereby diminishing a government's tax base and hurting its long-term financial condition (Brueckner 1979, 2000; Hoxby and Kuziemko 2004). Accrual-basis accounting numbers should provide more comprehensive measures of revenues and expenses and also help analysts make more consistent comparisons of a government's operating results over time or relative to other governments.

Second, the *Statement of Net Assets* should provide better information than the funds' *Balance Sheet* about the long-term viability of a government's revenue versus cost structure. The *Balance Sheet's* fund balance reports net current resources available for spending, while the *Statement of Net Assets* reports total net assets. Total net assets generally represent the difference between a government's cumulative revenues and costs, and its balance therefore provides evidence on the extent to which a government's past and current revenues have been sufficient to cover its past and current costs. A negative or decreasing total net asset balance could indicate the government's level of goods and services is unsustainable at current revenue levels.

GASB No. 34 also requires that total net assets be displayed in three separate components, and each of these components is likely to provide useful information about a government's financial condition. These components are: invested in capital assets, net of related debt (*INVCAP*); restricted net assets (*RNA*); and unrestricted net assets (*UNA*). *INVCAP* is equal to the historical cost of capital assets, reduced by accumulated depreciation and by the outstanding balances of any debt attributable to the acquisition, construction, or improvement of the capital assets. In general, larger values of *INVCAP* indicate a government has newer capital assets and/or smaller levels of capital-related debt. *RNA* is the difference between assets that are restricted and any liabilities payable from those restricted assets.⁸ Therefore, *RNA* values indicate the extent to which a government's assets are restricted for a particular program or need. *UNA* consists of net assets that do not meet the definitions of *INVCAP* or *RNA*, and is equal to the difference between the government's remaining assets and liabilities. A government's *UNA* balance is likely to be especially useful to analysts. For example, a negative *UNA* balance suggests that government revenues have been insufficient and that some costs have been shifted to future taxpayers (Wilson and Kattelus 2001). Even if the *UNA* balance is positive, a decreasing *UNA* balance over time suggests that the government is using up its accumulated resources to provide current services.

Finally, the new statements are likely to be useful because GASB No. 34 requires that capital assets be reported on the *Statement of Net Assets* and subsequently depreciated. This should help analysts estimate the full costs of government services—including depreciation

⁸ Restrictions include those externally imposed by creditors, grantors, contributors, or laws and regulations of other governments, as well as restrictions imposed by constitutional provisions or enabling legislation.

expense, the age and remaining useful life of the government's capital assets, and the government's need for capital asset replacement or expansion (Wilson and Kattelus 2001). This information should also help analysts make more consistent comparisons of capital asset needs for different governments or for the same government across time.

The discussion above suggests that the GASB No. 34 accrual-basis statements will provide incremental information over the funds statements. However, there are at least two arguments against this view. First, research on corporate entities finds that accrual earnings provide incremental information relative to cash flows and are a better measure of performance than cash flows (Dechow 1994; Dechow et al. 1998; Dechow and Dichev 2002). However, evidence suggests that the relative superiority of earnings is largely attributable to working capital accruals and not long-term accruals. The governmental funds statements are based on a modified working capital model (Freeman and Shoulders 2000, 113; Patton et al. 2005). Current financial assets and liabilities are the focus of the *Balance Sheet*, and changes in current financial assets and liabilities are the focus of the *Statement of Changes*. If the improvement in accrual-basis earnings is primarily attributable to working capital accruals, then the government-wide *Statement of Activities* is not likely to provide incremental information over the funds' *Statement of Changes*.

Second, research suggests that financial statement quality depends upon the market demand for financial reporting, and that quality decreases as market demand decreases (Ball et al. 2003; Ball and Shivakumar 2005). Broadly defined, "financial statement quality" addresses the extent to which accrual-basis accounting information reflects an entity's economic income and position (Ball et al. 2003; Ball and Shivakumar 2005). Ball and Shivakumar (2005) provide evidence that financial reporting for private companies is of lower quality than reporting for public companies, on average, even when accounting standards are the same. They attribute this to lower demand for private companies' financial statements. Governments are similar to private companies in that the market demand for their financial statements is likely to be lower than the market demand for public companies' financial statements (Pinnuck and Potter 2006).⁹ If lower demand results in lower quality, then the accrual-basis statements may not provide incremental information over the governmental funds statements.

Hypotheses

Our first hypothesis examines whether information from the governmental activities section of the new government-wide statements provides information relevant to assessing a school district's default risk:

H1: There is a significant association between the accounting information provided by government-wide financial statements and school districts' default risk.

The accounting information that we examine includes: revenues less expenses (a measure of a government's financial performance), total net assets (a measure of financial position), and current liabilities. These measures are analogous to those used in research that examines funds statements (Raman 1981; Wallace 1981; Wilson 1983; Wilson and Howard 1984; Apostolou et al. 1985; Reck et al. 2004).

⁹ Governments do not use their financial statements for contracting with management, or for transactions or valuations in equity markets, and their financial statements are not widely disseminated. In addition, all contracts and reporting requirements prior to GASB No. 34 were, by necessity, based on the funds statements. These factors suggest a lower demand for governmental financial statements, especially accrual-basis statements.

Previous studies that examine the association between a government's default risk and the financial performance of its funds provide mixed results. Some studies find a negative association (Wilson and Howard 1984), while other studies find no association (Ingram and Copeland 1982; Apostolou et al. 1984). Apostolou et al. (1985) allow the relation between fund financial performance and default risk to vary depending upon whether there is a current-year surplus (revenues > expenditures) or deficit (expenditures > revenues). The authors argue that a government's goal is not to maximize earnings, but rather to provide goods and services while maintaining a balanced budget. Current-year deficits *and* surpluses both signal a government's inability to balance total revenues with total expenditures. Apostolou et al. (1985) conjecture and find that a government's net interest cost increases as current-year deficits increase (deficits become larger) *and* as current-year surpluses increase. Therefore, we allow the relation between default risk and financial performance to vary across negative and positive performance values. We expect default risk to increase when deficits increase *and* when surpluses increase.

We use total net assets to measure a government's financial position. Total net assets generally represent the extent to which a government's cumulative revenues exceed its cumulative costs. Therefore, we expect that larger values indicate a stronger financial position and lower default risk. However, once a government's financial position is relatively strong, changes in its total net asset balance are likely to have a smaller marginal impact on the government's default risk. Therefore, in our empirical tests, we allow the relation between default risk and total net assets to vary according to whether a school district's total net asset balance is small or large, relative to other districts.¹⁰

We use a school district's current liabilities from the *Statement of Net Assets* to measure a district's debt level. We subtract out the current portion of long-term debt from this current liabilities measure because we treat a district's outstanding bond amount as a control variable. Risk should increase as debt increases, and we expect current liabilities to be positively related to default risk.¹¹

Our second hypothesis examines whether the different components of total net assets each provide relevant information for assessing default risk:

H2: There is a significant association between the separate components of total net assets (*INVCAP*, *RNA*, and *UNA*) and school districts' default risk.

We expect *INVCAP* to be inversely related to default risk for two reasons. First, *INVCAP* will be larger if a school district's outstanding capital-related debt is smaller, and smaller debt levels should be associated with lower default risk. Second, *INVCAP* will also be larger if accumulated depreciation is smaller. All else equal, smaller levels of accumulated depreciation indicate a government has newer capital assets. Because newer capital assets will not need to be replaced in the near future, the government is less likely to borrow additional funds, and its resources will be available for other uses. *Ceteris paribus*, newer capital assets should be associated with lower default risk. We also expect *UNA* to be

¹⁰ This is analogous to Fischer and Verrecchia's (1997) analysis of corporate debt. As long as a firm is financially strong, changes in its financial condition are likely to have limited relevance for default risk or debt price. In addition, governments do not strive to maximize their total net assets. A large total net asset balance could be viewed negatively if it indicates a government's inability to balance its budget over time or an unnecessary accumulation of assets.

¹¹ In our empirical tests, we treat a school district's long-term debt as a control variable in order to help minimize the likelihood of overstating the relative informativeness of the government-wide statements. Long-term debt information is typically available from nonfinancial statement sources.

inversely related to default risk. Larger *UNA* values suggest that the government has been better able to cover its costs and that excess resources can be used to pay off debt. As with total net assets, changes in *INVCAP* and *UNA* are likely to have a smaller marginal impact on default risk when a government's financial position is already relatively strong. Therefore, we allow the relation between default risk and *INVCAP*, and between default risk and *UNA*, to vary according to whether a school district's *INVCAP* or *UNA* balance is small or large relative to other districts.

On the *Statement of Net Assets*, GASB No. 34 requires school districts to show restricted net asset amounts, such as the amount restricted for debt service or for other purposes (e.g., federal and state programs, capital projects, and campus activities). We separately examine *RNA_DEBT* and *RNA_OTHER*. We do not make a prediction on the sign of the relation between *RNA_DEBT* and default risk because of conflicting predictions. A larger level of *RNA_DEBT* could indicate lower default risk because the district has accumulated resources for interest and bond payments, or it could indicate higher default risk if the restrictions were required by bondholders because they viewed the district as high-risk. Similarly, we do not make a prediction on the relation between *RNA_OTHER* and default risk because of conflicting predictions. If net assets are restricted because they can only be used to fund a specific program, then higher levels of *RNA_OTHER* might be associated with higher default risk because the resources cannot be used for other purposes (e.g., used for another program or for debt service). However, having more restricted net assets for a program reduces the need to use unrestricted net assets for that same purpose. This suggests that higher levels of *RNA_OTHER* might be associated with lower default risk.

Our last hypothesis examines whether the new government-wide statements provide additional information over that found in the contemporaneously published funds statements:

H3: Relative to the fund statements, government-wide financial statements provide *incremental* information about school districts' default risk.

As discussed above, the government-wide statements are intended to provide more comprehensive measures of a government's cost and its long-term financial condition. However, the incremental informativeness of these statements will be reduced if long-term accruals do not increase informativeness or if accruals quality is low.

III. VARIABLE DEFINITIONS AND SAMPLE

To test our hypotheses, we use ordered logit models of the general form:

$$\text{Default Risk} = f(\text{financial statement variables and control variables}),$$

where financial statement variables are constructed from information on the government-wide statements or the funds statements. In this section, we first describe our proxy for a school district's default risk. We then discuss the financial statement variables and control variables that we include in our empirical models. We conclude the section with a discussion of our sample.

Measure of Default Risk

Prior research shows that accounting information from governmental financial statements is significantly associated with a government's default risk, where default risk is

usually measured using a bond's rating, yield, or interest cost (Ingram et al. 1987; Reck et al. 2004). Because yields are a continuous measure and bond ratings are an ordinal measure, bond yields are generally a preferable measure of default risk. However, almost all bonds issued by school districts in the state of Texas are insured by the Texas Permanent School Fund (hereafter, the Fund). Municipal bond insurance is a guarantee by the insurer (in this case, the Fund) to make principal and interest payments on time and in full if the issuer defaults. When a municipal bond is insured, it automatically receives the insurance company's rating (usually AAA), and the bond's price adjusts to reflect the insurance company's default risk (Kidwell et al. 1987). Thus, bond ratings and yields of insured municipal bonds will be inappropriate proxies for the issuing government's default risk. Because the majority of municipal bond issues are insured (Gore et al. 2004), this is a significant obstacle for municipal bond research. As of August 31, 2002, Texas public school districts had \$27 billion of outstanding debt, with \$26 billion of that debt guaranteed by the Fund. Twenty-six (26) other states have similar school credit enhancement programs to lower interest costs for their public school districts (Miller and Bonifer 2004).¹²

The ideal default risk measure for our sample would be the bond yields absent credit enhancement. Unfortunately, this is not observable. All Fund-guaranteed bonds carry the Fund's AAA rating, and their market yields reflect this credit enhancement. However, a measure of default risk that is based on a school district's financial condition and that is observable is the district's underlying debt rating. This rating is based on an agency's assessment of a particular debt issue's credit quality absent credit enhancement. Underlying debt ratings thus reflect the financial condition and economic characteristics of each individual school district.¹³ Accordingly, we use a school district's underlying debt rating (*RATING*) as its measure of default risk:

RATING = a numerical transformation of the school district's underlying debt rating, with values between 1 and 14, where larger values correspond to a less favorable debt rating.

Variables from the Government-Wide Statements

To test H1 and H2, we model underlying debt ratings as a function of the following variables from the governmental activities section of the government-wide statements:

¹² The Texas Permanent School Fund is a perpetual endowment established in 1854 expressly for the benefit of Texas public schools. The Fund began using its endowment in 1983 to guarantee school bonds. The bonds must be voter-approved, general obligation debt secured by unlimited property taxes. The Fund is consistently rated AAA by all the major rating agencies. This rating is based on the Fund's large asset base (over \$20 billion), conservative limits on the amount of debt that can be insured, underlying creditworthiness of the guaranteed school districts, and strong oversight provisions. Since the program's inception, the Fund has guaranteed \$42 billion in school bonds (Moody's, November 2002; Miller 2004).

For bonds issued by Texas school districts during the period January 1999 through March 2003, 93 percent of the par amount was insured by the Fund, 3 percent was insured by bond insurance companies, and 4 percent was uninsured. For the same time period, Texas cities issued bonds with a total par value of \$13.9 billion, and 74.5 percent of that amount was insured; Texas counties issued a total amount of \$3.0 billion par value, and 59 percent of that amount was insured (Sources: Texas Bond Review Board and the Fund's 2002 financial statements).

¹³ There are three principal reasons why issuers would seek an underlying debt rating: (1) to achieve improved marketability at the time of the sale of credit-enhanced debt, (2) to improve secondary market liquidity for the debt, and (3) to establish and build market recognition, thereby improving future market access. Moody's will assign and publicly release an underlying rating requested by an issuer for debt that is entirely credit enhanced (Mergent 2003).

POS_{GW} = a measure of the school district's financial position, computed as total net assets, divided by total revenues;

$PERF_{GW}$ = a measure of the school district's financial performance, computed as total revenues minus total expenses, divided by total revenues;

$INVCAP$ = the school district's "invested in capital assets, net of related debt," divided by total revenues;

UNA = the school district's unrestricted net assets, divided by total revenues;

RNA_DEBT = the school district's net assets restricted for debt purposes, divided by total revenues;

RNA_OTHER = the school district's net assets restricted for non-debt purposes, divided by total revenues; and

CL_{GW} = the school district's current liabilities, not including the current portion of long-term bonds, divided by total revenues.

Variables from the Governmental Funds Statements

Hypothesis 3 tests whether the information provided by the government-wide variables is incremental to the information provided by the following variables from the governmental funds statements:

POS_{FUND} = a measure of the school district's financial position, computed as total fund balance, divided by total fund revenues;

$PERF_{FUND}$ = a measure of the school district's financial performance (or current-year spending), computed as total fund revenues minus expenditures, divided by total fund revenues; and

CL_{FUND} = the school district's fund liabilities, divided by total fund revenues.

These variables are constructed using information from the "total governmental funds" column because it includes the same spectrum of activities as does governmental activities in the government-wide statements.¹⁴ For each funds variable, the predicted relation with debt ratings is identical to that of the analogous government-wide variable.

Control Variables

We also include the following control variables in our ordered logit models:

$DEBT$ = the school district's outstanding bond amount, divided by the district's taxable property value;

$SIZE$ = log of the school district's student enrollment;

$OWNREV$ = percentage of the school district's budgeted revenues that are self-generated;

$\Delta WADA$ = percentage change in the school district's weighted-average daily attendance (WADA) over the past five years; and

$ECONDIS$ = percentage of economically disadvantaged students in the school district.

Our control variables reflect financial and socioeconomic factors that prior studies show are important in assessing a government's default risk. $DEBT$ measures a district's debt burden, relative to its fiscal capacity. Consistent with prior research, we expect default risk to

¹⁴ This comparability is demonstrated by the reconciliation statements required by GASB No. 34. See footnote 6.

increase as *DEBT* increases (Raman 1981; Wilson and Howard 1984). Prior studies find that default risk is lower for larger municipalities, where *SIZE* is commonly measured using the log of a municipality's population (Wilson and Howard 1984; Raman and Wilson 1994). We measure *SIZE* using log of student enrollment, and expect default risk to decrease as *SIZE* increases. Larger school districts are likely to have more marketable bond issues and better debt ratings. We use *OWNREV* to measure a school district's degree of fiscal self-reliance, with greater self-reliance being associated with better debt ratings (Raman 1981; Copeland and Ingram 1982; Lewis et al. 1988). This implies that default risk decreases as *OWNREV* increases.

Prior research finds that population growth is associated with greater default risk, most likely because of the increase in goods and services that the municipality must provide (Wallace 1981; Wilson and Howard 1984). We measure growth in student enrollment using $\Delta WADA$, and expect default risk to increase as $\Delta WADA$ increases.¹⁵ We include *ECONDIS* to measure a school district's economic well being. Prior studies find that a municipality's default risk increases as its economic condition weakens (Raman 1982; Wescott 1984; Wilson and Howard 1984; Ingram 1985; Dopuch and Gupta 1997). Because larger values of *ECONDIS* indicate a poorer economic condition, we expect default risk to increase as *ECONDIS* increases.¹⁶

Sample

We obtained school district financial statement information from the Texas Education Agency (TEA) for FYE August 31, 2002. All 1,034 Texas independent school districts had to issue GASB No. 34-compliant financial statements for FYE 2002. We lose one school district because of missing data, so the descriptive statistics in Table 1 are based on the financial statements for 1,033 school districts. Panel A provides descriptive information for selected items from the governmental activities section of the *Statement of Net Assets*, while Panel B provides information from the governmental funds *Balance Sheet*. Panel A shows that, on an accrual basis, the average (mean) book value for total assets is \$46.6 million, and the average book value for total liabilities is \$31.8 million. In contrast, the *Balance Sheet* shows average total assets of only \$16.3 million, and average total liabilities of only \$4.4 million (Panel B). The *Statement of Net Assets* shows larger total asset and liability amounts primarily because it includes capital assets (at cost less accumulated depreciation) and long-term liabilities, while the *Balance Sheet* does not. The last two lines of Panel A show that districts, on average, recorded an additional \$30.4 million of net capital assets and \$28.5 million of long-term liabilities. Panel A also provides descriptive information on the different components of total net assets. The largest component is "invested in capital assets, net of related debt," with an average of \$6.2 million. Unrestricted net assets is the next largest component, with an average of \$5.5 million. Restricted net assets, for purposes other than debt, averages \$2.5 million, while restricted net assets for debt service averages \$688,000.

¹⁵ $\Delta WADA$ is the percentage change over the past 5 years in the school district's number of weighted pupils (also known as "weighted average daily attendance" or WADA). Pupil-weighting causes a student to count as multiple students if he or she is costlier to educate (for example, if a student is disabled, needs bilingual or compensatory education, or participates in gifted and talented or vocational programs).

¹⁶ We obtained *SIZE*, *OWNREV*, and *ECONDIS* from school district *Snapshot* reports, available at: <http://www.tea.state.tx.us/perfreport/snapshot>. Data regarding school district WADA numbers came from the TEA's School Finance Division, and taxable property values came from the school district reports filed annually with the Texas Comptroller of Public Accounts.

TABLE 1
Descriptive Statistics from the Government-Wide and Governmental Funds Statements
(n = 1,033)

	<u>Mean</u>	<u>Q1</u>	<u>Median</u>	<u>Q3</u>	<u>Std. Dev.</u>
Panel A: Government-Wide Statement of Net Assets (in 000s)*					
Total Assets	\$ 46,596	\$ 4,159	\$ 9,907	\$ 27,211	\$ 134,541
Total Liabilities	31,815	779	3,296	15,177	103,441
Total Net Assets:	14,781	2,355	5,473	11,560	38,581
Invested in Capital Assets, net of related debt	6,182	785	2,383	5,741	19,726
Unrestricted Net Assets	5,456	782	2,058	4,419	14,342
Restricted Net Assets: Debt	688	0	44	367	3,045
Restricted Net Assets: Other	2,467	0	40	658	12,048
Capital Assets (net)	30,393	2,170	5,919	18,957	85,492
Long-Term Obligations	28,481	243	2,775	13,110	92,233
Panel B: Total Governmental Funds Balance Sheet (in 000s)					
Total Assets	\$ 16,276	\$ 1,493	\$ 3,542	\$ 9,025	\$ 52,217
Total Liabilities	4,396	358	858	2,524	17,175
Total Fund Balance	11,880	1,004	2,482	6,602	36,668
Unreserved Fund Balance	4,937	532	1,356	3,244	16,437
Panel C: Government-Wide Statement of Activities (in 000s)					
Total Revenues	\$ 25,919	\$ 2,940	\$ 6,507	\$ 16,985	\$ 75,402
Total Expenses	24,980	2,751	6,158	16,763	72,694
Revenues less Expenses	939	(2)	266	860	4,899
Panel D: Total Governmental Funds Statement of Revenues, Expenditures, and Changes in Fund Balance (in 000s)					
Total Revenues	\$ 30,723	\$ 3,496	\$ 7,763	\$ 21,495	\$ 87,949
Total Expenditures	34,371	3,543	8,049	23,049	97,918
Revenues less Expenditures	(3,648)	(1,300)	(90)	237	13,396

* The information in Panels A and C is from the governmental activities section of the government-wide statements.

Panels C and D of Table 1 provide descriptive information for selected items from the *Statement of Activities* and the *Statement of Changes*. Panel C shows that, on an accrual basis, average total revenues and expenses are \$25.9 million and \$25.0 million, respectively. This translates to an average current-year surplus of \$939,000. In contrast, Panel D shows that total revenues and expenditures on a modified accrual basis are \$30.7 million and \$34.4 million, respectively, with an average current-year deficit of \$3.6 million.

Of the 1,033 Texas school districts, 530 districts have an underlying debt rating as of August 31, 2003. We obtained the August 2003 debt ratings from the Texas Bond Review Board. This board compiles a list of all local governments in Texas that have an underlying debt rating at each August 31, using ratings from Moody's, Standard & Poor's, and Fitch's. We confirmed this list against Thomson Financial's SDC Platinum database. All 530 school

districts have general obligation bonds, guaranteed by the Fund. The mean par value is \$57.3 million, and the median par value is \$14.22 million. The first and third quartile values are \$4.9 million and \$42.7 million, respectively.¹⁷

IV. METHODS AND RESULTS

This section presents descriptive statistics for school districts with debt ratings, specifies the models we use to test our hypotheses, and presents our results.

Descriptive Statistics

Table 2 provides descriptive statistics for the independent variables used in our ordered logit models, and is based on the sample of 530 districts that have underlying debt ratings. POS_{GW} equals total net assets divided by total revenues. Panel A shows that the mean (median) POS_{GW} value is 0.730 (0.702). This suggests that, on average, cumulative revenues exceed cumulative costs. POS_{FUND} equals total fund balance divided by total revenues, and Panel B shows that the mean (median) POS_{FUND} value is 0.372 (0.290). Because governments generally have revenues that approximate expenditures, POS_{FUND} can be interpreted as the percentage of next year's expenditures that could be covered by the year-end fund balance, assuming expenditures remain constant. A district's year-end fund balance generally should cover about three months of expenditures because tax collections will not typically begin until November.

Panel A of Table 2 shows that the mean value of $PERF_{GW}$ is 0.039, and Panel B shows that the mean value of $PERF_{FUND}$ is -0.105. On an accrual basis, revenues slightly exceed expenses (surplus), while on a modified-accrual basis, expenditures exceed revenues (deficit). Panel C shows that the mean debt rating is 8.394, corresponding to an S&P rating between BBB and BBB+. The standard deviation of 3.248 indicates that debt ratings exhibit reasonable variation.

Table 3 presents Pearson correlations for selected variables from Table 2. Contrary to expectations, *RATING* is positively correlated with POS_{GW} and its components, *INVCAP* and *UNA*. Because a higher *RATING* indicates a less favorable debt rating, this suggests that debt ratings become worse as POS_{GW} increases, and this relation also holds for the *INVCAP* and *UNA* components. *RATING* is not significantly correlated with *RNA_DEBT*, *RNA_OTHER*, or $PERF_{GW}$. The correlation between *RATING* and CL_{GW} is marginally negative, and suggests that school districts with larger current liability balances have more favorable debt ratings. With respect to the fund measures, *RATING* is not correlated with POS_{FUND} or CL_{FUND} , and is positively correlated with $PERF_{FUND}$. The correlation between *RATING* and *DEBT* is marginally positive, suggesting that school districts with larger debt burdens have less favorable debt ratings. *DEBT* is negatively correlated with POS_{GW} , $PERF_{GW}$, and $PERF_{FUND}$, and is positively correlated with POS_{FUND} . This suggests that school districts with larger debt burdens have smaller levels of total net assets and smaller current-year surpluses, or larger current-year deficits, but have larger fund balances.

¹⁷ Only eight of the 530 districts also had revenue bonds outstanding. An additional 230 districts had general obligation bonds outstanding, no revenue bonds, and no underlying debt rating; and 274 districts had no bonds outstanding and no underlying debt rating. The median (mean) par amount for the 230 districts without an underlying debt rating is \$1.9 (\$3.3) million. The small average par value suggests that these bond issues were privately placed with a local bank as qualified tax-exempt obligations (bank-qualified). With private placements, an issuer is less concerned with the current and future marketability of the bonds, and therefore less likely to obtain a debt rating. Public-purpose bond offerings can be bank-qualified if the issuer reasonably expects to issue, during a given year, no more than \$10 million par amount of bonds of the type required to be included in making such a calculation. The purchasing bank receives an 80 percent tax deduction for the interest cost of carrying the issue. (See Section 265(b) of the Internal Revenue Code.)

TABLE 2
Descriptive Statistics: School Districts with Underlying Debt Ratings
(n = 530)

<u>Variable</u>	<u>Mean</u>	<u>Q1</u>	<u>Median</u>	<u>Q3</u>	<u>Std. Dev.</u>
Panel A: Government-Wide Measures^a					
POS_{GW}	0.730	0.491	0.702	0.933	0.390
$PERF_{GW}$	0.039	-0.000	0.040	0.087	0.085
CL_{GW}	0.109	0.067	0.092	0.135	0.070
$INVCAP$	0.339	0.142	0.353	0.567	0.400
UNA	0.257	0.145	0.233	0.339	0.196
RNA_DEBT	0.029	0.007	0.023	0.045	0.030
RNA_OTHER	0.105	0.002	0.013	0.077	0.250
Panel B: Total Governmental Funds Measures					
POS_{FUND}	0.372	0.192	0.290	0.453	0.306
$PERF_{FUND}$	-0.105	-0.164	-0.038	0.022	0.194
CL_{FUND}	0.130	0.088	0.119	0.153	0.064
Panel C: Underlying Debt Ratings and Control Variables					
$RATING$	8.394	7.00	9.00	11.00	3.248
$DEBT$	0.029	0.011	0.023	0.040	0.026
$SIZE$	7.839	6.871	7.710	8.609	1.297
$OWNREV$	46.79	30.00	42.00	59.00	22.83
$\Delta WADA$	0.118	0.021	0.086	0.182	0.156
$ECONDIS$	45.21	30.90	43.30	58.20	20.66

^a The information in Panel A is from the governmental activities section of the government-wide statements, and the information in Panel B is from total governmental funds.

Variable Definitions:

$RATING$ = a numerical transformation of the school district's underlying debt rating, with values between 1 and 14, where larger values correspond to a *less* favorable debt rating;

POS_{GW} = a measure of the school district's financial position, computed as total net assets, divided by total revenues;

$PERF_{GW}$ = a measure of the school district's financial performance, computed as total revenues minus total expenses, divided by total revenues;

CL_{GW} = the school district's current liabilities, not including the current portion of long-term bonds, divided by total revenues;

$INVCAP$ = the school district's "invested in capital assets, net of related debt," divided by total revenues;

UNA = the school district's unrestricted net assets, divided by total revenues;

RNA_DEBT = the school district's net assets restricted for debt purposes, divided by total revenues;

RNA_OTHER = the school district's net assets restricted for non-debt purposes, divided by total revenues;

POS_{FUND} = a measure of the school district's financial position, computed as total fund balance, divided by total fund revenues;

$PERF_{FUND}$ = a measure of the school district's financial performance (or current-year spending), computed as total fund revenues minus expenditures, divided by total fund revenues;

CL_{FUND} = the school district's fund liabilities, divided by total fund revenues;

$DEBT$ = the school district's outstanding bond amount, divided by the district's taxable property value;

$SIZE$ = log of the school district's student enrollment;

$OWNREV$ = percentage of the school district's budgeted revenues that are self-generated;

$\Delta WADA$ = percentage change in the school district's weighted-average daily attendance over the past five years;

$ECONDIS$ = percentage of economically disadvantaged students in the school district;

Small = an indicator variable equal to 1 if POS , $INVCAP$, or UNA is smaller than the median, and 0 otherwise;

Large = an indicator variable equal to 1 if POS , $INVCAP$, or UNA is larger than the median, and 0 otherwise;

Neg = an indicator variable equal to 1 if $PERF$ is negative, and 0 otherwise; and

Pos = an indicator variable equal to 1 if $PERF$ is positive, and 0 otherwise.

TABLE 3
Pearson Correlations for Selected Variables: School Districts with Underlying Debt Ratings^a
(n = 530)

Variable	RATING	POS _{GW}	PERF _{GW}	CL _{GW}	POS _{FUND}	PERF _{FUND}	CL _{FUND}	INVCAP	UNA	RNA_DEBT	RNA_OTHER
POS _{GW}	0.272 (0.001)										
PERF _{GW}	0.054 (0.215)	0.209 (0.001)									
CL _{GW}	-0.106 (0.015)	-0.064 (0.144)	0.011 (0.808)								
POS _{FUND}	-0.043 (0.326)	0.182 (0.001)	0.073 (0.093)	0.076 (0.079)							
PERF _{FUND}	0.123 (0.005)	0.145 (0.001)	0.303 (0.001)	-0.168 (0.001)	-0.216 (0.001)						
CL _{FUND}	-0.005 (0.903)	0.056 (0.196)	0.062 (0.154)	0.742 (0.001)	0.130 (0.003)	-0.156 (0.001)					
INVCAP	0.181 (0.001)	0.707 (0.001)	0.118 (0.007)	-0.041 (0.346)	-0.340 (0.001)	0.234 (0.001)	0.037 (0.399)				
UNA	0.156 (0.001)	0.450 (0.001)	0.226 (0.001)	-0.128 (0.003)	0.292 (0.001)	0.133 (0.002)	-0.027 (0.528)	0.020 (0.654)			
RNA_DEBT	-0.049 (0.263)	-0.049 (0.265)	-0.044 (0.309)	0.080 (0.066)	0.111 (0.010)	-0.082 (0.059)	0.102 (0.018)	-0.143 (0.001)	-0.042 (0.336)		
RNA_OTHER	0.018 (0.686)	0.081 (0.063)	-0.035 (0.418)	0.057 (0.190)	0.587 (0.001)	-0.243 (0.001)	0.038 (0.380)	-0.498 (0.001)	-0.108 (0.013)	0.066 (0.130)	
DEBT	0.082 (0.058)	-0.219 (0.001)	-0.156 (0.001)	0.128 (0.003)	0.328 (0.001)	-0.426 (0.001)	0.124 (0.004)	-0.333 (0.001)	-0.114 (0.009)	0.095 (0.029)	0.270 (0.001)

^a All variables are defined in TABLE 2. p-values (two-tailed) are in parentheses.

Although some of the correlations in Table 3 are contrary to expectations, univariate correlations do not measure the incremental effect of financial information on debt ratings after controlling for other determinants of debt rating, including our control variables. In addition, the Table 3 correlations do not allow for possible differences across the range of *PERF* and *POS* values. Therefore, Table 4 presents Pearson correlations for subsamples of districts with negative and positive *PERF* values (Panel A), and *Small* and *Large POS* values (Panel B). Negative *PERF* values indicate that a school district has a current-year deficit. Panel A of Table 4 shows that 25 percent of school districts have a negative *PERF_{GW}* value, while 65 percent have a negative *PERF_{FUND}* value. The negative values of *PERF_{GW}* and *PERF_{FUND}* are not significantly correlated with debt ratings. In contrast, Panel A shows that the positive values of *PERF_{GW}* and *PERF_{FUND}* are positively correlated with debt ratings. This suggests that debt ratings become less favorable as a district's surplus increases. This is consistent with Apostolou et al. (1985) who find that a government's net interest cost increases as its current-year surplus increases.

To compute the correlations in Panel B of Table 4, we rank school districts separately on *POS_{GW}* and *POS_{FUND}*, as well as *INVCAP* and *UNA*. For each measure, we divide school districts into two groups: districts with values below the median (*Small*), and districts with values above the median (*Large*). We then compute correlations separately for each group. For all four measures, Panel B shows that the correlations differ across the *Small* and *Large* subsamples. For the *Small* subsamples, the correlation between each financial position measure and debt ratings is either significantly negative (*POS_{FUND}* and *UNA*) or not significantly different from zero. This suggests that, when a district's fund balance or unrestricted net asset balance is smaller than average, larger balances are associated with more favorable debt ratings. In contrast, for the *Large* subsamples, the correlations are either significantly

TABLE 4
Pearson Correlations between Underlying Debt Ratings and Accounting Variables, for Positive/Negative *PERF* Values and Small/Large *POS*, *INVCAP*, and *UNA* Values*

<u>Variable</u>	<u>n</u>	<u>% of Districts</u>	<u>Correlation</u>	<u>p-value</u>
Panel A: Correlations of <i>RATING</i> with Negative and Positive Values of <i>PERF</i>				
<i>PERF_{GW}*Neg</i>	133	25%	-0.050	0.567
<i>PERF_{GW}*Pos</i>	397	75%	0.167	0.001
<i>PERF_{FUND}*Neg</i>	344	65%	0.023	0.668
<i>PERF_{FUND}*Pos</i>	186	35%	0.142	0.053
Panel B: Correlations of <i>RATING</i> with Small and Large Values of <i>POS</i>, <i>INVCAP</i>, and <i>UNA</i>				
<i>POS_{GW}*Small</i>	265	50%	0.056	0.364
<i>POS_{GW}*Large</i>	265	50%	0.119	0.053
<i>POS_{FUND}*Small</i>	265	50%	-0.141	0.021
<i>POS_{FUND}*Large</i>	265	50%	0.042	0.501
<i>INVCAP*Small</i>	265	50%	-0.074	0.232
<i>INVCAP*Large</i>	265	50%	0.121	0.049
<i>UNA*Small</i>	265	50%	-0.125	0.042
<i>UNA*Large</i>	265	50%	0.169	0.006

* All variables are defined in TABLE 2. p-values are two-tailed.

positive (POS_{GW} , $INVCAP$, UNA) or not significantly different from zero (POS_{FUND}). When a district's total net asset balance (as a percentage of revenues) is relatively large, larger balances are associated with less favorable debt ratings. Overall, the correlations in Table 4 provide support for allowing the relation between debt ratings and the accounting variables to vary across *Neg/Pos* and *Small/Large* values.

Hypothesis 1

To test H1 and provide evidence on the relevance of government-wide statements for explaining default risk, we estimate the following ordered logit model (district subscripts are suppressed for notational convenience):

$$\begin{aligned} RATING = & \beta_0 + \beta_1 POS_{GW} * Small + \beta_2 POS_{GW} * Large + \beta_3 PERF_{GW} * Neg \\ & + \beta_4 PERF_{GW} * Pos + \beta_5 CL_{GW} + \beta_6 DEBT + \beta_7 SIZE \\ & + \beta_8 OWNREV + \beta_9 \Delta WADA + \beta_{10} ECONDIS + \varepsilon \end{aligned} \quad (1)$$

where:

Small = an indicator variable equal to 1 if POS_{GW} is smaller than the median, and 0 otherwise;

Large = an indicator variable equal to 1 if POS_{GW} is larger than the median, and 0 otherwise;

Neg = an indicator variable equal to 1 if $PERF_{GW}$ is negative, and 0 otherwise; and

Pos = an indicator variable equal to 1 if $PERF_{GW}$ is positive, and 0 otherwise.

All other variables are defined in Section III.¹⁸ POS_{GW} represents the extent to which the district's cumulative revenues exceed its cumulative costs, and we expect default risk to decrease as POS_{GW} increases. Because changes in POS_{GW} are likely to have a smaller marginal impact on default risk when a district's financial position is relatively strong, we allow the relation between *RATING* and POS_{GW} to vary across districts with *Small* and *Large* POS_{GW} values. β_1 represents the association between debt ratings and POS_{GW} for districts with POS_{GW} values below the median, and β_2 represents this association for districts with POS_{GW} values above the median. A lower value of *RATING* indicates a better debt rating, and we expect both β_1 and β_2 to be negative.

β_3 represents the association between debt ratings and negative values of $PERF_{GW}$ (current-year deficit), and β_4 represents the association between debt ratings and positive $PERF_{GW}$ values (current-year surplus). An increase in either deficit or surplus spending indicates a departure from a balanced budget, and a potential increase in default risk. Consistent with Apostolou et al. (1985), we expect β_3 to be negative and β_4 to be positive. Last, prior research finds that a municipality's default risk increases as its current liabilities increase (Raman 1982; Lewis et al. 1988), and we expect β_5 to be positive.

Predictions for our control variables can be summarized as follows. We expect that default risk will increase as *DEBT*, *ΔWADA*, and *ECONDIS* increase. This implies that β_6 ,

¹⁸ We deflate all financial statement variables by total revenues to obtain greater uniformity in the data and ensure that a few observations do not exert excessive influence on our estimates (Maddala 1977). For all equations, we also estimate models that include separate intercept dummy variables for *Small/Large* and *Neg/Pos*. The inferences from these models are the same as those reported in the paper. We omit the intercepts for ease of exposition.

β_9 , and β_{10} will be positive. In contrast, we expect that default risk will decrease as *SIZE* and *OWNREV* increase, suggesting that β_7 and β_8 will be negative.¹⁹

The middle columns of Table 5 report the results for Equation (1). To minimize the effect of outliers in our analyses, we delete observations that are in the top and bottom 1 percent of the $PERF_{GW}$ and POS_{GW} distributions. Equation (1) results provide partial support for the hypothesis that the government-wide statements provide relevant information for default risk. Consistent with H1, the coefficients on $POS_{GW} * Small$ and $POS_{GW} * Large$ are significantly negative (p-values = 0.003), with coefficient values equal to -1.557 and -0.837 , respectively. This suggests that default risk decreases as POS_{GW} increases. Tests also indicate that the absolute value of the coefficient on $POS_{GW} * Small$ is greater than that of the coefficient on $POS_{GW} * Large$ ($p = 0.023$). This suggests that increases in POS_{GW} have a greater impact on the odds of a school district's having a more favorable debt rating when POS_{GW} is relatively smaller.²⁰ Inconsistent with H1, the coefficients for $PERF_{GW}$ and CL_{GW} are not significantly different from zero. After controlling for the other explanatory variables, $PERF_{GW}$ and CL_{GW} do not provide incremental information on debt ratings.²¹

All coefficient estimates for our control variables are in the predicted directions and significant. The model's pseudo- R^2 is 73.5 percent, indicating that the model does a relatively good job of explaining debt ratings. The coefficient on *DEBT* is significantly positive ($p < 0.001$), suggesting that districts with larger debt burdens have less favorable debt ratings. The coefficients on *SIZE* and *OWNREV* are both significantly negative ($p < 0.001$). This suggests that debt ratings are more favorable for larger school districts and school districts with greater fiscal self-reliance. Last, the coefficients on $\Delta WADA$ and *ECONDIS* are both significantly positive ($p = 0.002$ and $p < 0.001$), which suggests that school districts with greater strains on their resources have less favorable debt ratings.

Hypothesis 2

To test H2, we modify Equation (1) by replacing total net assets (POS_{GW}) with its components and estimating the following ordered logit model:

$$\begin{aligned} RATING = & \alpha_0 + \alpha_1 INVCAP * Small_j + \alpha_2 INVCAP * Large_j + \alpha_3 UNA * Small_j \\ & + \alpha_4 UNA * Large_j + \alpha_5 RNA\_DEBT + \alpha_6 RNA\_OTHER \\ & + \alpha_7 PERF_{GW} * Neg + \alpha_8 PERF_{GW} * Pos + \alpha_9 CL_{GW} + \alpha_{10} DEBT \\ & + \alpha_{11} SIZE + \alpha_{12} OWNREV + \alpha_{12} \Delta WADA + \alpha_{13} ECONDIS + \varepsilon \end{aligned} \quad (2)$$

¹⁹ Prior studies have used various proxies to measure a municipality's economic condition, including percentage of disadvantaged students, poverty rate, unemployment rate, and minority population. We run all results using percentage of minority students, and our inferences are unchanged.

²⁰ See Agresti (2002, 281–282). Because of the difficulty in interpreting the effects of independent variables when the dependent variable has multiple categories (Ashbaugh-Skaife et al. 2006), we also estimate a logistic regression model where *RATING* is coded as a binary dependent variable corresponding to whether a district's rating is "above BBB+" or "BBB+ and below." Results indicate that the absolute value of the $POS_{GW} * Small$ coefficient is greater than that of the $POS_{GW} * Large$ coefficient ($p < 0.05$).

²¹ There is no direct test for multicollinearity when estimating an ordered logistic regression model. However, to provide some evidence on whether multicollinearity affects our results, we estimate all models in Tables 5, 6, and 7, using OLS regression and examine the variance inflation factors (VIF) and condition indices. In all cases, the VIFs are less than 4, and the condition indices are less than 20, suggesting that multicollinearity is not affecting our results.

TABLE 5
Results from Ordered Logit Regression of Underlying Debt Ratings on Government-Wide Measures and Control Variables

$$RATING = \beta_0 + \beta_1 POS_{GW} * Small + \beta_2 POS_{GW} * Large + \beta_3 PERF_{GW} * Neg + \beta_4 PERF_{GW} * Pos + \beta_5 CL_{GW} + \beta_6 DEBT + \beta_7 SIZE + \beta_8 OWNREV + \beta_9 \Delta WADA + \beta_{10} ECONDIS + \epsilon$$

Variable	Predicted Sign	Equation (1)		Equation (2)	
		Coefficient	p-value ^a	Coefficient	p-value
POS _{GW} *Small	-	-1.557	0.003		
POS _{GW} *Large	-	-0.837	0.003		
PERF _{GW} *Neg	-	3.409	0.317	3.869	0.264
PERF _{GW} *Pos	+	1.336	0.226	1.686	0.178
CL _{GW}	+	-0.076	0.950	-0.263	0.829
INVCAP*Small	-			-1.455	0.007
INVCAP*Large	-			-0.473	0.061
UNA*Small	-			-2.779	0.008
UNA*Large	-			-0.808	0.065
RNA_DEBT	?			-0.458	0.880
RNA_OTHER	?			-1.429	0.005
DEBT	+	16.764	<0.001	17.607	<0.001
SIZE	-	-2.143	<0.001	-2.117	<0.001
OWNREV	-	-0.049	<0.001	-0.049	<0.001
ΔWADA	+	1.917	0.002	1.934	0.002
ECONDIS	+	0.019	<0.001	0.020	<0.001
Sample Size		512		512	
Pseudo R ²		73.5%		73.8%	
Likelihood Ratio χ ²		653.15		656.82	

^a p-values are one-tailed when the coefficient estimate is in the predicted direction, and two-tailed otherwise. *RATING* is coded so that a positive coefficient indicates the variable is associated with less favorable debt ratings, and a negative coefficient indicates the variable is associated with more favorable debt ratings.

where:

Small_j = an indicator variable equal to 1 if *INVCAP* (or *UNA*) is smaller than the median *INVCAP* (or *UNA*), and 0 otherwise; and

Large_j = an indicator variable equal to 1 if *INVCAP* (or *UNA*) is larger than the median *INVCAP* (or *UNA*), and 0 otherwise.

All other variables are as defined above. The coefficients α_1 and α_2 represent the association between debt ratings and *INVCAP* for school districts with *INVCAP* values that are below and above the median, respectively. Similarly, α_3 and α_4 represent the association between debt ratings and *UNA* for school districts with *UNA* values that are below and above the median, respectively. We expect all four coefficients to be negative (i.e., larger values of *INVCAP* and *UNA* indicate a stronger financial position and lower default risk), but allow this relation to differ across *Large* and *Small* values. We do not specify a direction for the coefficients on *RNA_DEBT* and *RNA_OTHER* because of the conflicting predictions discussed earlier.

The last two columns of Table 5 report results for Equation (2). Overall, the results support H2 and suggest that *INVCAP*, *UNA*, and *RNA_OTHER* are informative about underlying debt ratings. Consistent with H2, the coefficients for *INVCAP*Small* and *INVCAP*Large* are both significantly negative ($p = 0.007$ and $p = 0.061$), with estimated coefficients equal to -1.455 and -0.473 , respectively. Also consistent with H2, the coefficients for *UNA*Small* and *UNA*Large* are both significantly negative ($p = 0.008$ and $p = 0.065$), with estimated coefficients equal to -2.779 and -0.808 , respectively. These results suggest that default risk decreases as *INVCAP* and *UNA* increase. Tests also indicate that the absolute value of the *INVCAP*Small* coefficient is greater than that of the *INVCAP*Large* coefficient ($p = 0.037$), and the absolute value of the *UNA*Small* coefficient is greater than that of the *UNA*Large* coefficient ($p = 0.017$). This suggests that increases in *INVCAP* and *UNA* have a greater impact on the odds of a school district's having a more favorable debt rating when their balances are relatively smaller.²² The coefficient on *RNA_DEBT* is not significantly different from zero, suggesting that this measure provides no information on debt ratings. In contrast, the coefficient on *RNA_OTHER* is significantly negative ($\alpha_6 = -1.429$, $p = 0.005$). This suggests that default risk decreases as net assets, restricted for non-debt purposes, increase.

The Equation (2) results for *PERF_{GW}* and *CL_{GW}* are similar to the results for Equation (1), with none of the coefficients being significantly different from zero. All control variables are in their predicted directions and highly significant. Overall, the results in Table 5 provide support for H2 and partial support for H1. Total net assets and its components, reported on the government-wide *Statement of Net Assets*, provide information that is relevant for assessing debt ratings. However, the accrual-basis "earnings" measure (*PERF_{GW}*) and accrued current liabilities (*CL_{GW}*) do not provide relevant information about debt ratings.

Hypothesis 3

Hypothesis 3 examines whether the information provided by the government-wide statements is incremental to that provided by the governmental funds statements. Prior research

²² As with *POS_{GW}*, we also estimate a logistic regression model where *RATING* is coded as a binary dependent variable. Results indicate that the absolute value of the *INVCAP*Small* coefficient is greater than that of the *INVCAP*Large* coefficient ($p < 0.10$), and the absolute value of the *UNA*Small* coefficient is greater than that of the *UNA*Large* coefficient ($p < 0.10$).

provides mixed evidence on the relevance of funds statement variables for explaining a government's default risk. Therefore, before testing the relative information content of the government-wide statements versus the funds statements, we first provide evidence on the general informativeness of the funds statements for our sample of school districts. To do this, we modify Equation (1) by replacing the government-wide variables POS_{GW} , $PERF_{GW}$, and CL_{GW} , with their counterparts from the funds statements and estimating the following ordered logit model:

$$\begin{aligned} RATING = & \beta_0 + \beta_1 POS_{FUND} * Small + \beta_2 POS_{FUND} * Large + \beta_3 PERF_{FUND} * Neg \\ & + \beta_4 PERF_{FUND} * Pos + \beta_5 CL_{FUND} + \beta_6 DEBT + \beta_7 SIZE \\ & + \beta_8 OWNREV + \beta_9 \Delta WADA + \beta_{10} ECONDIS + \epsilon \end{aligned} \quad (3)$$

where:

Small = an indicator variable equal to 1 if POS_{FUND} is smaller than the median, and 0 otherwise;

Large = an indicator variable equal to 1 if POS_{FUND} is larger than the median, and 0 otherwise;

Neg = an indicator variable equal to 1 if $PERF_{FUND}$ is negative, and 0 otherwise; and

Pos = an indicator variable equal to 1 if $PERF_{FUND}$ is positive, and 0 otherwise.

The other variables are as defined above. The predicted directions for the Equation (3) coefficients are identical to those for Equation (1). We expect β_1 , β_2 , and β_3 to be negative, and β_4 and β_5 to be positive.

Table 6 reports results for estimating Equation (3). We delete observations that are in the top and bottom 1 percent of the $PERF_{FUND}$ and POS_{FUND} distributions, and an additional 21 observations for which $|PERF_{FUND}| > 0.50$.²³ Results suggest that $PERF_{FUND}$ and CL_{FUND} are informative for explaining debt ratings for our sample of school districts. $PERF_{FUND} * Neg$ represents deficit spending, and its coefficient is significantly negative ($\beta_3 = -4.596$, $p = 0.016$). $PERF_{FUND} * Pos$ represents surplus spending, and its coefficient is significantly positive ($\beta_4 = 5.728$, $p = 0.068$). These results are consistent with Apostolou et al. (1985), and suggest that default risk decreases as current-year deficits become less negative, and that default risk increases as current-year surpluses increase. We also find that CL_{FUND} 's coefficient is significantly positive ($\beta_5 = 3.160$, $p = 0.012$). This is consistent with evidence from Raman (1982) and Lewis et al. (1988), and suggests that default risk increases as liabilities on the funds statements increase. Results provide only weak evidence that POS_{FUND} helps explain debt ratings for our sample of school districts. The coefficient on $POS_{FUND} * Small$ is not significantly different from zero, and the coefficient on $POS_{FUND} * Large$ is marginally significant ($p = 0.091$). Last, all coefficient estimates for our control variables are in the predicted directions and significant, and the model's pseudo- R^2 is 71.8 percent. Overall, the Table 6 results suggest that $PERF_{FUND}$ and CL_{FUND} provide relevant information for assessing default risk, but POS_{FUND} does not. These results are exactly opposite of the Table 5 results. For the government-wide statements, POS_{GW} was informative for default risk, but $PERF_{GW}$ and CL_{GW} were not.

²³ These observations are extreme and influential observations for which expenditures exceed revenues by at least 50 percent. An examination of the financial statements for these districts indicates that the values are generally due to unusual or nonrecurring items (e.g., large capital outlays).

TABLE 6
Results from Ordered Logit Regression of Underlying Debt Ratings on Governmental Funds Measures and Control Variables

$$\begin{aligned}
 RATING = & \beta_0 + \beta_1 POS_{FUND} * Small + \beta_2 POS_{FUND} * Large + \beta_3 PERF_{FUND} * Neg \\
 & + \beta_4 PERF_{FUND} * Pos + \beta_5 CL_{FUND} + \beta_6 DEBT + \beta_7 SIZE + \beta_8 OWNREV \\
 & + \beta_9 \Delta WADA + \beta_{10} ECONDIS + \varepsilon
 \end{aligned}$$

Variable	Predicted Sign	Coefficient	p-value ^a
$POS_{FUND} * Small$	—	-0.221	0.428
$POS_{FUND} * Large$	—	-0.554	0.091
$PERF_{FUND} * Neg$	—	-4.596	0.016
$PERF_{FUND} * Pos$	+	5.728	0.068
CL_{FUND}	+	3.160	0.012
$DEBT$	+	25.031	<0.001
$SIZE$	—	-2.048	<0.001
$OWNREV$	—	-0.040	<0.001
$\Delta WADA$	+	2.371	0.001
$ECONDIS$	+	0.017	<0.001
Sample Size		489	
Pseudo R ²		71.8%	
Likelihood Ratio χ^2		595.22	

^a p-values are one-tailed when the coefficient is in the predicted direction, and two-tailed otherwise. *RATING* is coded so that a positive coefficient indicates the variable is associated with less favorable debt ratings, and a negative coefficient indicates the variable is associated with more favorable debt ratings.

Next, we test H3 and compare the information content of the government-wide statements with that of the funds statements. Specifically, we compare POS_{GW} with POS_{FUND} , $PERF_{GW}$ with $PERF_{FUND}$, and CL_{GW} with CL_{FUND} . For each comparison, we estimate three ordered logit models: (1) the *funds model*, which includes control variables and funds variables; (2) the *government-wide model*, which includes control variables and government-wide variables; and (3) the *expanded model*, which includes control variables, funds variables, and government-wide variables.²⁴ We then examine the incremental information content of the government-wide variables relative to the funds variables using a likelihood ratio χ^2 test. We supplement this with a Vuong test and a Wald χ^2 test for differences in the coefficient estimates.

Results are presented in Table 7, Panels A through C. The first two lines of each panel present the estimated coefficients on the financial statement variables for the funds and government-wide models, and the likelihood ratio χ^2 for each model. The third line presents

²⁴ For example, when comparing POS_{GW} with POS_{FUND} , we estimate the following ordered logit models:

$$\begin{aligned}
 \text{Funds Model: } RATING &= f(POS_{FUND} * Small, POS_{FUND} * Large, \text{control variables}); \\
 \text{Government-wide Model: } RATING &= f(POS_{GW} * Small, POS_{GW} * Large, \text{control variables}); \text{ and} \\
 \text{Expanded Model: } RATING &= f(POS_{FUND} * Small, POS_{FUND} * Large, POS_{GW} * Small, \\
 & POS_{GW} * Large, \text{control variables}).
 \end{aligned}$$

the likelihood ratio χ^2 for the expanded model. (The table does not present estimated coefficients for the control variables or for the expanded model.) The Table 7 coefficient values and significance levels are consistent with the results in Tables 5 and 6, and suggest that POS_{GW} , $PERF_{FUND}$, and CL_{FUND} provide relevant information for explaining debt ratings. The variables POS_{FUND} , $PERF_{GW}$, and CL_{GW} do not.

The likelihood ratio test compares the χ^2 for the model that includes the funds and control variables (the funds model) with a model that also includes the government-wide variables (the expanded model). The difference in χ^2 values for the two models ($\Delta\chi^2$) has a χ^2 distribution, with degrees of freedom equal to the number of variables being tested. If $\Delta\chi^2$ is at or above the critical value, then we can conclude that the government-wide

TABLE 7
Tests of Government-Wide Accounting Variables versus
Governmental Funds Accounting Variables

Panel A: POS_{GW} versus POS_{FUND}

Model Specification (all models include control variables)	n	Coefficient on $POS*Small$	Coefficient on $POS*Large$	Model's Likelihood Ratio χ^2
Funds model ($POS_{FUND}*Small$, $POS_{FUND}*Large$)	498	-0.367	-0.503	613.52
Government-wide model ($POS_{GW}*Small$, $POS_{GW}*Large$)	498	-1.504***	-0.798***	619.60
Expanded model (all four POS variables above)	498			620.36
Likelihood ratio χ^2 tests:				
$\Delta\chi^2$ of expanded model versus funds model				6.84**
$\Delta\chi^2$ of expanded model versus government-wide model				0.76
Vuong Z-statistic for comparing government-wide vs. funds models*				2.01**
Wald χ^2 for difference in coefficients		3.89**	0.66	

Panel B: $PERF_{GW}$ versus $PERF_{FUND}$

Model Specification (all models include control variables)	n	Coefficient on $PERF*Neg$	Coefficient on $PERF*Pos$	Model's Likelihood Ratio χ^2
Funds model ($PERF_{FUND}*Neg$, $PERF_{FUND}*Pos$)	478	-4.162**	5.921*	588.50
Government-wide model ($PERF_{GW}*Neg$, $PERF_{GW}*Pos$)	478	-2.039	0.900	582.14
Expanded model (all four $PERF$ variables above)	478			588.92
Likelihood ratio χ^2 tests:				
$\Delta\chi^2$ of expanded model versus funds model				0.42
$\Delta\chi^2$ of expanded model versus government-wide model				6.78**
Vuong Z-statistic for comparing government-wide vs. funds models				-2.03**
Wald χ^2 for difference in coefficients		0.38	2.73*	

(continued on next page)

TABLE 7 (Continued)

Panel C: CL_{GW} versus CL_{FUND}

Model Specification (all models include control variables)	n	Coefficient on CL	Model's Likelihood Ratio χ^2
Funds model (CL_{FUND})	498	2.181**	614.24
Government-wide model (CL_{GW})	498	-0.080	612.24
Expanded model (CL_{FUND} and CL_{GW})	498		616.65
Likelihood ratio χ^2 tests:			
$\Delta\chi^2$ of expanded model versus funds model			2.41
$\Delta\chi^2$ of expanded model versus government-wide model			4.41**
Vuong Z-statistic for comparing government-wide vs. funds models			-2.89***
Wald χ^2 for difference in coefficients		3.10*	

***, **, * Indicates significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

* A positive Vuong Z-statistic indicates that the funds measure is rejected in favor of the government-wide measure. Reported probabilities are from a two-tailed test.

variables significantly improve the model and provide incremental information for explaining debt ratings (DeMaris 1992; Ishii-Kuntz 1994). The last column of Table 7, Panel A, shows that the POS funds model has a likelihood ratio χ^2 of 613.52 compared with the expanded model's χ^2 of 620.36 ($\Delta\chi^2 = 6.84$). This increase has a χ^2 distribution ($df = 2$), and is significant at $p < 0.05$. This is consistent with H3 and suggests that POS_{GW} provides incremental information over POS_{FUND} for explaining debt ratings. In contrast, the likelihood ratio tests provide no support for H3 with respect to $PERF_{GW}$ and CL_{GW} . Panel B shows that adding $PERF_{GW}$ variables to the funds model results in a $\Delta\chi^2 = 0.42$, and Panel C shows that adding CL_{GW} to the funds model results in a $\Delta\chi^2 = 2.41$. Neither value is significantly different from zero.

In each panel, we also provide results for a likelihood ratio test that compares the expanded model with the government-wide model. This provides evidence on whether the funds variables provide incremental information over that of the government-wide variables. For this comparison, Panel A of Table 7 shows that $\Delta\chi^2 = 0.76$, which is not significantly different from zero. This implies that POS_{FUND} does not provide additional information over that of POS_{GW} . However, results indicate that $PERF_{FUND}$ does provide information that is incremental to $PERF_{GW}$ (Panel B: $\Delta\chi^2 = 6.78$, $df = 2$; $p < 0.05$), and that CL_{FUND} provides information that is incremental to CL_{GW} (Panel C: $\Delta\chi^2 = 4.41$, $df = 1$; $p < 0.05$).

As supplemental analysis, we also perform Vuong likelihood ratio tests for model selection to determine whether the government-wide model or funds model better explains debt ratings. To obtain the residuals necessary for the Vuong test, we must use logistic regressions that have a binary dependent variable (Santos Silva 2001). Therefore, we use an alternative classification scheme that partitions ratings into two categories: "above BBB+" and "BBB+ and below." Vuong test results are consistent with the likelihood ratio test results. Panel A of Table 7 shows that Vuong's Z-statistic rejects POS_{FUND} in favor of POS_{GW} (Vuong Z = 2.01, $p < 0.05$). This is consistent with H3 and suggests that POS_{GW} provides more information than POS_{FUND} for explaining debt ratings. The Vuong tests in Panels B and C provide no support for H3. Panel B shows that the Vuong test rejects $PERF_{GW}$ in favor of $PERF_{FUND}$ (Vuong Z = -2.03, $p < 0.05$), and Panel C shows that

CL_{GW} is rejected in favor of CL_{FUND} (Vuong $Z = -2.89$, $p < 0.01$). This suggests that $PERF_{FUND}$ and CL_{FUND} provide more information for explaining debt ratings than $PERF_{GW}$ and CL_{GW} , respectively.

Our last test is a Wald χ^2 test that compares coefficient values from the funds and government-wide models.²⁵ Results are presented in the last line of each panel in Table 7. Panel A shows that the coefficient on $POS_{GW} * Small$ is significantly larger in magnitude than the coefficient on $POS_{FUND} * Small$ ($p < 0.05$). For *Large* values, the coefficients for POS_{GW} and POS_{FUND} are not significantly different. This provides some support for H3 and suggests that POS_{GW} has a greater impact than POS_{FUND} on the odds of a school district's having a more favorable debt rating, at least when POS_{GW} is relatively smaller. Panel B presents results for comparisons of the $PERF_{GW}$ and $PERF_{FUND}$ coefficients, and Panel C presents results for comparisons of the CL_{GW} and CL_{FUND} coefficients. These results provide no support for H3. Instead, the results indicate that the coefficients are larger in magnitude for the funds variables than the government-wide variables. Overall, the Table 7 results suggest that POS_{GW} is the only government-wide variable that provides incremental information over the funds statement. $PERF_{GW}$ and CL_{GW} do not.

V. CONCLUSIONS

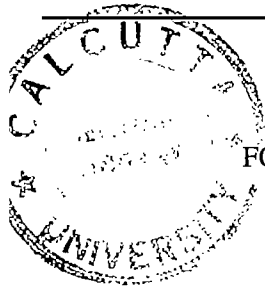
This study examines the relevance of the new government-wide statements required by GASB No. 34. In sum, our results suggest that total net assets and its components, all reported on the *Statement of Net Assets*, provide information relevant to assessing a school district's underlying debt rating. We also find that these measures provide incremental information over that of the funds statements. In contrast, we find that accrual-basis measures of "earnings" (revenues less expenses) and current liabilities are not associated with school districts' debt ratings, and are not more informative than their counterparts from the governmental funds statements. For our school districts, total net assets and a modified-accrual "earnings" measure provide the best information for explaining debt ratings. A government's modified-accrual "earnings" can be thought of as a type of measure of changes in working capital. Our evidence therefore suggests that a school district's long-term accruals are not incrementally informative over its working capital accruals. This is consistent with research on corporate entities that attributes the superiority of earnings over cash flows largely to working capital accruals and not long-term accruals.

Several limitations of our study should be noted. First, we examine the relevance of GASB No. 34 for explaining debt ratings. We do not examine the informativeness of GASB No. 34 statements for other user groups, including taxpayers, voters, legislators, and oversight boards (Banker et al. 1992). GASB No. 34 is also intended to help their decision making. Second, we do not examine the costs or benefits associated with increased reporting requirements. GASB No. 34's opponents argue that the standard is costly to implement and monitor (Copley et al. 1997). However, a government's debt cost may decrease if GASB No. 34 disclosures reduce information uncertainty and/or asymmetry (Baber and Gore 2005), or if the government chooses conservative accrual accounting methods (Ahmed et al. 2002; Francis et al. 2004; Sengupta 1998). We also do not examine whether mandating disclosures changes a government's use of alternatives for reducing debt costs, such as bond insurance (Gore et al. 2004).

²⁵ The Wald χ^2 value used to compare coefficient estimates is equal to the difference between the two coefficients (squared), divided by the summation of the variances of the two coefficient estimates. We also estimate the expanded model and test whether the coefficients on the government-wide and funds variables are significantly different from one another. Results are similar to those presented in Table 7.

In this study, we examine GASB No. 34 statements for Texas school districts. By focusing on a homogeneous sample of governments, we increase the internal validity of our study but decrease the generalizability of its results. Future studies should examine whether our results extend to other municipalities (including states, cities, and counties) and other measures of default risk. It would also be useful to identify governments that have larger reconciling differences between accrual "earnings" and modified accrual "earnings." Larger differences could increase the likelihood that the *Statement of Activities* provides incremental information. A sample of uninsured municipal bonds could provide an opportunity to examine the relation between bond yields and GASB No. 34 financial information. Research could also examine whether debt contracts written after GASB No. 34's implementation refer to the new accrual-basis statements in their debt covenants.

In this study, we do not examine the time-series or predictive properties of GASB No. 34 financial statement information. Our analysis is cross-sectional and limited to one year. Future studies can examine the economic properties of governmental accrual "earnings" (Pinnuck and Potter 2006), and compare them with the economic properties of governmental modified accrual "earnings" and corporate accrual earnings. Examining accrual accounting in a distinctly different environment from the corporate sector provides opportunities to increase our understanding of issues such as accruals quality, accounting method choices, conservatism, and timeliness.



APPENDIX
SAMPLE INDEPENDENT SCHOOL DISTRICT

STATEMENT OF NET ASSETS
FOR THE FISCAL YEAR ENDED AUGUST 31, 2002

	Primary Government
	Governmental
	Activities
Assets	
Cash and Cash Equivalents	\$ 38,311,763
Property Taxes Receivable (Delinquent)	7,586,411
Allowance for Uncollectible Taxes	(3,076,221)
Due from Other Governments	2,890,609
Accrued Interest	5,931
Due from Fiduciary Funds	37,046
Other Receivables	69,867
Inventories—Supplies and Materials	345,751
Other Current Assets	678,706
Capital Assets (Net of Accumulated Depreciation):	
Land	8,924,180
Buildings	124,827,588
Machinery and Equipment	3,521,724
Total Assets	184,123,355
Liabilities	
Accounts Payable and Accrued Expenses	6,899,326
Interest Payable	131,028
Payroll Deductions and Withholdings Payable	252,573
Accrued Wages Payable	8,302,777
Due to Other Governments	2,428,096
Current Portion—Bonds Payable	2,805,000
Current Portion—Other Long-Term Debt	1,188,395
Deferred Revenues	1,271,827
Long-Term Liabilities:	
Bonds Payable—Long-Term	59,665,000
Other Long-Term Debt Payable	1,229,411
Compensated Absences	5,121,448
Total Liabilities	89,294,881
Net Assets	
Invested in Capital Assets, Net of Related Debt	72,385,686
Restricted for Food Service	2,037,879
Restricted for Debt Service	1,338,933
Restricted for Capital Projects	347,506
Unrestricted Net Assets	18,718,470
Total Net Assets	\$ 94,828,474

STATEMENT OF ACTIVITIES
FOR THE FISCAL YEAR ENDED AUGUST 31, 2002

	Program Revenues			Net (Expense) Revenue and Changes in Net Assets
	Expenses	Charges for Services	Operating Grants and Contributions	Capital Grants and Contributions
Governmental Activities				
Instruction	\$ 87,014,915	\$ 517,759	\$ 15,386,842	\$ —
Instructional Resources and Media Services	2,005,157	—	199,397	—
Curriculum/Instructional Development	1,583,698	—	992,989	—
Instructional Leadership	3,488,072	—	1,543,002	—
School Leadership	8,503,679	—	627,140	—
Guidance and Counseling Services	4,247,029	—	780,169	—
Social Work Services	734,698	—	237,774	—
Health Services	1,660,989	—	172,833	—
Student (Pupil) Transportation	4,835,947	—	327,386	—
Food Services	9,139,221	2,809,436	6,421,953	—
Curricular/Extracurricular Activities	3,169,239	327,442	61,572	—
General Administration	4,321,858	—	138,961	—
Plant Maintenance and Operations	15,473,887	60,000	419,928	—
Security and Monitoring Services	661,277	—	10,225	—
Data Processing Services	1,082,141	—	195,865	—
Community Services	909,230	99,636	719,234	—
Debt Service—Interest on Long-Term Debt	3,585,277	—	6,599	—
Payments to Fiscal Agents	89,470	—	—	—
Juvenile Justice Alternative Education	168,000	—	—	—
Total Primary Government	\$ 152,673,784	\$ 3,814,273	\$ 28,241,869	\$ (120,617,642)

(continued on next page)

STATEMENT OF ACTIVITIES
FOR THE FISCAL YEAR ENDED AUGUST 31, 2002 (Continued)

General Revenues:	
Taxes:	
Property Taxes, levied for general purposes	90,948,872
Property Taxes, levied for debt service	4,656,053
Grants and Contributions not Restricted	22,431,885
Investment Earnings	929,844
Miscellaneous Local and Intermediate	3,157,116
Total General Revenues	122,123,770
Change in Net Assets	1,506,128
Net Assets—September 1 (Beginning)	93,565,674
Prior Period Adjustment	(243,328)
Net Assets—September 1 (Restated)	93,322,346
Net Assets—August 31 (Ending)	\$ 94,828,474

**BALANCE SHEET
GOVERNMENTAL FUNDS
FOR THE FISCAL YEAR ENDED AUGUST 31, 2002**

	General Fund	Other Funds	Total Governmental Funds
Assets			
Cash and Temporary Investments (market)	\$ 28,127,457	\$ 5,005,902	\$ 33,133,359
Property Taxes—Delinquent	7,293,492	292,919	7,586,411
Allowance for Uncollectible Taxes (credit)	(2,992,390)	(83,831)	(3,076,221)
Due from Other Governments	—	2,890,607	2,890,607
Accrued Interest	—	5,931	5,931
Due from Other Funds	1,455,063	15,793	1,470,856
Other Receivables	58,190	4,994	63,184
Inventories, at Cost	17,094	328,657	345,751
Other Current Assets	612,580	—	612,580
Total Assets	\$ 34,571,486	\$ 8,460,972	\$ 43,032,458
Liabilities			
Accounts Payable and Accrued Expenditures	\$ 1,488,489	\$ 996,612	\$ 2,485,101
Payroll Deductions and Withholdings Payable	240,065	12,508	252,573
Accrued Wages Payable	7,289,663	1,013,114	8,302,777
Due to State	2,428,092	—	2,428,092
Due to Other Funds	197,281	1,418,017	1,615,298
Deferred Revenues	4,188,658	739,144	\$ 4,927,802
Total Liabilities	\$ 15,832,248	\$ 4,179,395	\$ 20,011,643
Fund Balance			
Reserved Fund Balance			
Investments in Inventory	\$ 17,094	\$ 170,930	\$ 188,024
Retirement of Long-Term Debt	—	1,487,112	1,487,112
Prepaid Items	611,156	—	611,156
Outstanding Encumbrances	195,472	238,150	433,622
Food Service	—	2,037,879	2,037,879
Designated Fund Balance			
Construction	—	347,506	347,506
Other	1,750,000	—	1,750,000
Unreserved, Undesignated Fund Balance	16,165,516	—	16,165,516
Total Fund Balance	\$ 18,739,238	\$ 4,281,577	\$ 23,020,815
Total Liabilities and Fund Balance	\$ 34,571,486	\$ 8,460,972	\$ 43,032,458

STATEMENT OF REVENUES, EXPENDITURES,
AND CHANGES IN FUND BALANCE
GOVERNMENTAL FUNDS
FOR THE FISCAL YEAR ENDED AUGUST 31, 2002

	General Fund	Other Funds	Total Governmental Funds
Revenues			
Local Sources	\$ 95,795,185	\$ 8,107,419	\$ 103,902,604
State Program Revenues	25,846,089	4,421,091	30,267,180
Federal Program Revenues	1,241,094	19,050,765	20,291,859
Total Revenues	<u>122,882,368</u>	<u>31,579,275</u>	<u>154,461,643</u>
Expenditures			
Current			
Instruction	71,766,534	11,953,546	83,720,080
Instructional Resources and Media Services	1,807,734	121,912	1,929,646
Curriculum and Instructional Development	592,092	982,103	1,574,195
Instructional Leadership	1,888,034	1,457,320	3,345,354
School Leadership	7,900,763	228,362	8,129,125
Guidance and Counseling Services	3,434,935	607,174	4,042,109
Social Work Services	480,299	223,504	703,803
Health Services	1,492,888	99,169	1,592,057
Student (Pupil) Transportation	4,854,124	142,759	4,996,883
Food Services	39,067	8,909,530	8,948,597
Cocurricular/Extracurricular Activities	3,191,856	2,523	3,194,379
General Administration	4,199,975	8,926	4,208,901
Plant Maintenance and Operations	14,995,983	111,455	15,107,438
Security and Monitoring Services	651,052	10,225	661,277
Data Processing Services	882,545	167,145	1,049,690
Community Services	549	895,065	895,614
Debt Service—Principal on long-term debt	5,089	3,816,324	3,821,413
Debt Service—Interest on long-term debt	37,234	3,565,195	3,602,429
Facilities Acquisition and Construction	26,479	1,520,681	1,547,160
Payments to Fiscal Agents	89,470	—	89,470
Juvenile Justice Alternative Education	168,000	—	168,000
Total Expenditures	<u>118,504,702</u>	<u>34,822,918</u>	<u>153,327,620</u>
Excess (Deficiency) of Revenues Over (Under) Expenditures	<u>4,377,666</u>	<u>(3,243,643)</u>	<u>1,134,023</u>

(continued on next page)

Other Financing Sources**(Uses):**

Sale of Real and Personal Property	4,572	—	4,572
Operating Transfers In	—	1,303,050	1,303,050
Operating Transfers Out	(1,303,050)	—	(1,303,050)
Total Other Financing Sources (Uses)	(1,298,478)	1,303,050	4,572
Net Change in Fund Balances	3,079,188	(1,940,593)	1,138,595
Fund Balance—September 1 (Beginning)	15,903,378	6,222,170	22,125,548
Prior Period Adjustment	(243,328)	—	(243,328)
Fund Balance—September 1 (Restated)	15,660,050	6,222,170	21,882,220
Fund Balance—August 31 (Ending)	\$ 18,739,238	\$ 4,281,577	\$ 23,020,815

REFERENCES

- Agresti, A. 2002. *Categorical Data Analysis*. Hoboken, NJ: John Wiley & Sons, Inc.
- Ahmed, A. S., B. K. Billings, R. M. Morton, and M. Stanford-Harris. 2002. The role of accounting conservatism in mitigating bondholder-shareholder conflicts over dividend policy and in reducing debt costs. *The Accounting Review* 77: 867–890.
- Apostolou, N. G., J. Reeve, and G. A. Giroux. 1984. Accounting information and municipal net interest cost: An empirical evaluation. *Journal of Accounting and Public Policy*: 9–28.
- , G. Giroux, and R. B. Welker. 1985. The information content of municipal spending rate data. *Journal of Accounting Research* 23: 853–858.
- Ashbaugh-Skaife, H., D. W. Collins, and R. LaFond. 2006. The effects of corporate governance on firms' credit ratings. *Journal of Accounting and Economics* 42 (1-2) 203–243.
- Baber, W. R., and A. Gore. 2005. Consequences of GAAP reporting requirements: Evidence from municipal debt issues. Working paper, University of Oregon.
- Ball, R., A. Robin, and J. S. Wu. 2003. Incentives versus standards: Properties of accounting income in four East Asian countries. *Journal of Accounting and Economics* 36: 235–270.
- , and L. Shivakumar. 2005. Earnings quality in UK private firms: Comparative loss recognition timeliness. *Journal of Accounting and Economics* 39: 83–128.
- Banker, R. D., W. W. Cooper, and G. Potter. 1992. A perspective on research in governmental accounting. *The Accounting Review* 67: 496–510.
- , S. Janakiraman, and R. Natarajan. 2004. Analysis of trends in technical and allocative efficiency: An application to Texas public school districts. *European Journal of Operational Research* 154: 477–491.
- Barton, A. 2005. Professional accounting standards and the public sector—A mismatch. *Abacus* 41 (2): 138–158.
- Brueckner, J. K. 1979. Property values, local public expenditure, and economic efficiency. *Journal of Public Economics* 11: 223–245.
- . 2000. A Tiebout/tax-competition model. *Journal of Public Economics* 77: 285–306.
- Chaney, B. A., and P. A. Copley. 2002. The association between accounting measures and true interest cost on municipal bonds: A test of GASB 14 entity definition and display provisions. Working paper, University of Montana.
- Copeland, R. M., and R. W. Ingram. 1982. The association between municipal accounting information and bond rating changes. *Journal of Accounting Research* 20: 275–289.

- Copley, P. A., R. H. Cheng, J. E. Harris, R. C. Icerman, W. L. Johnson, G. R. Smith, K. A. Smith, W. T. Wrege, and R. Yahr. 1997. The new governmental reporting model: Is it a "Field of Dreams"? *Accounting Horizons* 11 (September): 91–101.
- Cullen, J. B. 2003. The impact of fiscal incentives on student disability rates. *Journal of Public Economics* 87: 1557–1589.
- Dechow, P. M. 1994. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics* 18: 3–42.
- , S. P. Kothari, and R. L. Watts. 1998. The relation between earnings and cash flows. *Journal of Accounting and Economics* 25: 133–168.
- , and I. D. Dichev. 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 77: 35–59.
- Deis, D. R., and G. A. Giroux. 1992. Determinants of audit quality in the public sector. *The Accounting Review* 67: 462–479.
- DeMaris, A. 1992. Logit modeling: Practical applications. Sage University Papers Series, Quantitative Applications in the Social Sciences, No. 07–086. Beverly Hills, CA: Sage Press.
- Dopuch, N., and M. Gupta. 1997. Estimation of benchmark performance standards: An application to public school expenditures. *Journal of Accounting and Economics* 23: 141–161.
- Fischer, P., and R. Verrecchia. 1997. The effect of limited liability on the market response to disclosure. *Contemporary Accounting Research* 14 (Fall): 515–541.
- Francis, J., R. LaFond, P. M. Olsson, and K. Schipper. 2004. Costs of equity and earnings attributes. *The Accounting Review* 79: 967–1010.
- Freeman, R. J., and C. D. Shoulders. 2000. *Governmental and Nonprofit Accounting: Theory and Practice*. 6th edition, revised for GASB Statement 34. Upper Saddle River, NJ: Prentice Hall, Inc.
- Gist, W. E. 1992. The market for school district bonds: An empirical analysis of Texas independent school districts. *Southwest Journal of Business and Economics* 9: 31–39.
- Gore, A. K., K. Sachs, and C. Trzcinka. 2004. Financial disclosure and bond insurance. *Journal of Law and Economics* 47 (April): 275–306.
- Governmental Accounting Standards Board (GASB). 1987. *Objectives of Financial Reporting*. Concepts Statement No. 1. Stamford, CT: GASB.
- . 1999a. *GASB Releases New Standard That Will Significantly Change Financial Reporting by State and Local Governments*. June 30, 1999. Available at: www.gasb.org/news/nr63099.html.
- . 1999b. *Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments*. Statement No. 34. Norwalk, CT: GASB.
- . 2005. *Communication Methods in General Purpose External Financial Reports that Contain Basic Financial Statements*. Concepts Statement No. 3. Stamford, CT: GASB.
- Hoxby, C., and I. Kuziemko. 2004. Robin Hood and his not-so-merry plan: Capitalization and the self-destruction of Texas' school finance equalization plan. Working paper, Harvard University.
- Hsueh, L. P., and D. S. Kidwell. 1988. The impact of a state bond guarantee on state credit markets and individual municipalities. *National Tax Journal* 41: 235–245.
- Ingram, R. W., and R. M. Copeland. 1982. Municipal market measures and reporting practices: An extension. *Journal of Accounting Research* 20: 766–772.
- . 1985. A descriptive analysis of municipal bond price data for use in accounting research. *Journal of Accounting Research* 23: 595–618.
- , K. K. Raman, and E. R. Wilson. 1987. Governmental capital markets research in accounting: A review. *Research in Governmental and Nonprofit Accounting* 3: 111–126.
- , ———, and ———. 1989. The information in governmental annual reports: A contemporaneous price reaction approach. *The Accounting Review* 64: 250–268.
- International Federation of Accountants (IFAC). 1996. *Perspectives on Accrual Accounting*. Occasional Paper 3. London, U.K.: IFAC.
- . 2006a. *Cash Basis IPSAS: Financial Reporting under the Cash Basis of Accounting*. London, U.K.: IFAC.

- . 2006b. *Presentation of Financial Statements*. International Public Sector Accounting Standards No. 1. London, U.K.: IFAC.
- Ishii-Kuntz, M. 1994. Ordinal log-linear models. Sage University Papers Series, Quantitative Applications in the Social Sciences No. 97. Beverly Hills, CA: Sage Press.
- Kidwell, D. S., E. H. Sorensen, and J. M. Wachowicz, Jr. 1987. Estimating the signaling benefits of debt insurance: The case of municipal bonds. *Journal of Financial and Quantitative Analysis* 22: (September): 299–313.
- Klasny, E. M., and J. M. Williams. 2000. Government reporting faces an overhaul. *Journal of Accountancy Online Issues* (January). Available at: <http://www.aicpa.org/pubs/jofa/jan2000/klasny.htm>.
- Kravchuk, R. S., and W. R. Voorhees. 2001. The new governmental financial reporting model under GASB Statement No. 34: An emphasis on accountability. *Public Budgeting and Finance* (Fall): 1–30.
- Lewis, B. L., J. M. Patton, and S. L. Green. 1988. The effects of information choice and information use on analysts' predictions of municipal bond rating changes. *The Accounting Review* 63: 270–282.
- Maddala, G. S. 1977. *Econometric*. New York, NY: McGraw-Hill, Inc.
- Mergent. 2003. *Mergent Bond Record*. May. New York, NY: Mergent.
- Miller, J. L. 2004. *GKST Municipal Research: The Permanent School Fund of Texas*. January 5. Chicago, IL: Griffin, Kubik, Stephens and Thompson, Inc.
- , and D. J. Bonifer. 2004. *GKST Municipal Research: School Credit Enhancement Programs*. June 16. Chicago, IL: Griffin, Kubik, Stephens and Thompson, Inc.
- Patton, T. K., R. E. Reese, and K. D. Johnson. 2005. Conceptual basis for current financial resource flows measurement focus. GASB Staff Paper. Norwalk, CT: GASB.
- Pinnuck, M., and B. N. Potter. 2006. The quality and conservatism of the accounting earnings of local governments. Working paper, University of Melbourne.
- Raman, K. K. 1981. Financial reporting and municipal bond rating changes. *The Accounting Review* 56: 910–926.
- . 1982. Financial reporting and municipal bond ratings. *Journal of Accounting, Auditing, and Finance* 5: 144–153.
- , and E. R. Wilson. 1994. Governmental audit procurement practices and seasoned bond prices. *The Accounting Review* 69: 517–538.
- Reck, J. L., E. R. Wilson, D. Gotlob, and C. M. Lawrence. 2004. Governmental capital markets research in accounting: A review, extension, and directions for future research. *Research in Governmental and Nonprofit Accounting* 11: 1–33.
- Santos Silva, J. M. C. 2001. A score test for non-nested hypotheses with applications to discrete data models. *Journal of Applied Econometrics* 16: 577–597.
- Sengupta, P. 1998. Corporate disclosure quality and the cost of debt. *The Accounting Review* 73: 459–474.
- Strand, C. A., G. Giroux, and J. Thorne. 1999. A public choice analysis of bond referenda and capital outlays of Texas school districts. *Journal of Public Budgeting, Accounting & Financial Management* 11: 509–532.
- Wallace, W. A. 1981. The association between municipal market measures and selected financial reporting practices. *Journal of Accounting Research* 19: 502–520.
- Wescott, S. H. 1984. Accounting numbers and socioeconomic variables as predictors of municipal general obligation bond ratings. *Journal of Accounting Research* 22: 412–423.
- Wilson, E. R. 1983. Fiscal performance and municipal bond borrowing costs. *Public Budgeting and Finance* (Winter): 28–41.
- , and T. P. Howard. 1984. The association between municipal market measures and selected financial reporting practices: Additional evidence. *Journal of Accounting Research* 22: 207–224.
- , and S. C. Kattelus. 2001. Implications of GASB's new reporting model for municipal bond analysts and managers. *Public Budgeting and Finance* (Fall): 47–62.

- U.S. Census Bureau. 2002a. *2002 Census of Governments: State and Local Government Finances*. Available at: http://www.census.gov/govs/www/02PubUsedoc_GovOrg.html.
- . 2002b. *2002 Census of Governments, Volume 4, Number 1, Government Finances: Public Education Finances*. GC02(4)–1. August. Washington, D.C.: Government Printing Office.

The Effect of Auditors' Use of a Reciprocity-Based Strategy on Auditor-Client Negotiations

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ABSTRACT: Auditors face the challenging tasks of attesting that the financial statements are free from material misstatement while simultaneously fostering a functional working relationship with the client. As the financial statements may be considered, in part, a product of negotiations between the auditor and client management (Antle and Nalebuff 1991), the negotiation strategy employed by the auditor may be useful in effectively fulfilling both tasks. To investigate the effect of auditor strategy on the resolution of proposed audit adjustments in a post Sarbanes-Oxley environment, we conduct experiments that examine both the client and auditor sides of the negotiation. We investigate a strategy of "concession" that draws upon the societal rule of reciprocity, which makes the waiving of inconsequential audit differences transparent. Specifically, with a concession approach, the auditor brings to the attention of the client all the audit differences (both significant and inconsequential) discovered during the audit and, subsequently, waives the inconsequential items. In contrast, a strategy of "no-concession" of inconsequential items (in which the auditor discloses to the client only the significant audit differences that must be booked) renders the client unaware of the waived inconsequential differences. Results from the *client* experiments indicate that, relative to a no-concession approach, participants representing client management (controllers/CFOs) are more willing to post significant income-decreasing adjustments (both objective and subjective) when exposed to a concession approach in the course of negotiating the final contents of the audited financial statements. A concession approach also results in greater client satisfaction and retention. Consistent

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with these findings, results from the *auditor* experiment suggest that auditors also perceive that altering their approach toward greater disclosure of waived inconsequential audit differences can improve client satisfaction and retention.

Keywords: *audit adjustment; negotiation; client satisfaction; client retention; audit differences; reciprocation.*

Data Availability: *Data are available upon request.*

I. INTRODUCTION

This study examines how auditor negotiation strategy during the resolution of proposed adjustments to the financial statements may affect the client's willingness to post significant income-decreasing audit adjustments, as well as client satisfaction and retention. Antle and Nalebuff (1991) note that the contents of financial statements are a result of a negotiation between the auditor and the client, and that this negotiation can affect accounting disclosure. In addition to the resolution of proposed adjustments, negotiation has an important influence on client relations (Gibbins et al. 2001). Thus, the process of resolving audit differences could affect client retention and satisfaction, as well as the resulting financial statements.

Auditors are in a unique environment in which they have a duty to users of the financial statements to provide independent assurance regarding the financial statements while maintaining an amicable relationship with the management of the corporation, who are responsible for preparing the financial statements. Although auditors and client management may have different motives (e.g., auditors are typically conservative with respect to reported earnings, while management generally would prefer not to record income-decreasing adjustments [Antle and Nalebuff 1991; Wang and Tuttle 2005]), an adequate relationship is beneficial to the performance of the audit (Shaub 2004). In addition, auditor compensation depends on their ability to retain clients and, to the extent possible under the Sarbanes-Oxley Act of 2002, increase their level of service (and billing) to their clients. And, even though Sarbanes-Oxley significantly increases the role of the audit committee, client management remains most influential with regard to issues such as auditor retention and compensation (KPMG 2004).¹ The current regulatory environment, brought on by recent high-profile audit failures, has resulted in a climate of demanding greater scrutiny of financial statements. Thus, the balance between the need for sound and constructive client relations and the auditors' obligations to shareholders and regulators is becoming increasingly difficult to maintain.

It may be possible for auditors to better achieve both aims through their approach to negotiation with the client. A strategic approach by the auditor has the potential to improve audit quality by promoting a more collaborative negotiating environment, thereby reducing pressure to accept the client's position and likewise reducing client resistance to the auditor's position. Suppose, for example, that the audit team uncovers a number of audit differences (i.e., potential adjustments) during the course of the engagement, some of which are significant (i.e., clearly material or potentially material) and some of which are inconsequential to the financial statements (i.e., have no impact on financial statement users and fall outside the auditor's materiality scope and posting threshold). To receive an unqualified opinion, the auditor determines that the client will need to post only the significant audit

¹ A recent survey of audit committee members and other executives finds that controllers/CFOs have the greatest influence (e.g., greater than the audit committee) over issues such as auditor retention and compensation (KPMG 2004).

differences. The auditor could choose to simply bring to the client the significant differences, which must be booked, and waive the inconsequential items without ever bringing them to the client's attention (hereafter, the "no-concession" approach). Alternatively, the auditor could disclose to the client all audit differences (inconsequential as well as significant differences) uncovered by the audit team and then waive the inconsequential differences.² By waiving the inconsequential differences in full view of the client (rendering the process more transparent), the auditor can promote a collaborative environment that encourages the client to be more cooperative in the posting of significant adjustments. In addition, this approach may serve to foster better client relations and improve the likelihood of client retention. This "concession" approach draws upon the societal rule of reciprocity (e.g., Pruitt and Carnevale 1993; Cialdini 2001).³

To investigate the effect of auditor strategy on the resolution of proposed audit adjustments in a post-Sarbanes-Oxley environment, we conduct experiments that examine both the client (experiments 1A and 1B) and auditor (experiment 2) sides of the negotiation. We investigate the effect of a *concession* approach, in which the waiving of inconsequential audit differences is made transparent to the client, relative to a strategy in which no audit differences are waived in view of the client (*no-concession* approach). Results of experiment 1A indicate that participants representing client management (controllers and CFOs) are more willing to post significant income-decreasing adjustments when exposed to a concession approach in the course of negotiating the final contents of the audited financial statements. Client managers are also more satisfied and more likely to prefer to remain as clients of the audit firm when the auditor utilizes a concession approach, relative to a no-concession approach. The significant adjustments utilized in experiment 1A were relatively objective in nature. We extend these findings through experiment 1B in which results indicate that a concession approach also increases client managers' willingness to post more contentious *subjective* adjustments while improving client relations. Further, client managers exposed to such a strategy tend to have less aggressive negotiation parameters (i.e., more conservative initial offers and negotiation limits) than with a no-concession approach. Through experiment 2, we examine the other side of the negotiation table to explore how auditors view the use of this approach and their perception of its effect on client satisfaction and retention. Similar to the results obtained with client management (experiments 1A and 1B), by altering their approach toward greater disclosure of waived inconsequential audit differences (i.e., observable concession), auditors feel they can improve client satisfaction and retention.

The remainder of this paper is organized as follows. The next section discusses the background and related research and develops the hypotheses. Sections III and IV present the method and results for experiments 1 and 2, respectively. Section V offers conclusions and implications.

² Discussions with 15 audit partners and managers indicate that this preliminary disclosure typically would occur prior to preparation of the summary of unadjusted audit differences required by SAS No. 89, and that inconsequential items disclosed to client management at this point would not need to be included in the summary of unadjusted audit differences presented to the audit committee. It should also be noted that the current regulatory environment (i.e., SAS No. 89 and Sarbanes-Oxley) does not necessitate that items waived (either at the work-paper level or in view of the client) be communicated to the audit committee if the items are considered inconsequential by the auditor. Additionally, discussions with practicing auditors indicate that both approaches (i.e., disclosure/non-disclosure of inconsequential items to client management) are still available to auditors post-Sarbanes-Oxley.

³ Our "concession approach" could be viewed as an *explicit*-concession approach (i.e., the waived items are observable by the client). Similarly, our "no-concession approach" could be viewed as a *no-explicit*-concession approach (i.e., the waived items are not observable). For conciseness, we adopt the shorter terminology.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Auditor-Client Negotiations

Although the management representation letter asserts that management bears responsibility, a company's financial statements can be viewed as a joint effort of both management and the auditor (Antle and Nalebuff 1991). Antle and Nalebuff (1991) suggest that the resulting financial statements are dependent on the negotiation strategy employed by the auditor. Much of the prior research has focused on the disposition of proposed audit adjustments with respect to their type/characteristics, finding that adjustments are more likely to be waived when: they are immaterial, they are income-increasing, the client is large, the audit committee is ineffective, authoritative guidance is lacking, and risk of waiving is low (e.g., Wright and Wright 1997; Braun 2001; Nelson et al. 2002; Ng and Tan 2003). Research has also begun to explore the auditor-client interaction. For example, recent studies find that: auditors are hesitant to use an approach that involves inflating dollar amounts of proposed adjustments, mandatory audit term limits reduce auditors' willingness to compromise, and auditors with low negotiation experience concede more when engagement risk is high (e.g., Goodwin 2002; Ng and Tan 2003; Bame-Aldred and Kida 2006; Brown and Johnstone 2005; Gibbins et al. 2006; Wang and Tuttle 2005).

Gibbins et al. (2001) explicitly consider the negotiation process and provide survey evidence regarding negotiation experience of practicing auditors. They find that 67 percent of audit partners surveyed enter into negotiations with more than half of their clients and that *all* partners surveyed enter into negotiations with at least some of their clients. Additionally, the partners believe negotiation is a frequent and vital part of their responsibilities and is part of the service they provide to the client (Gibbins et al. 2001). Beattie et al. (2000, 2004) provide similar evidence regarding the frequency of these interactions and conclude that, in the aggregate, these negotiations tend to have a significant impact on the contents of the financial statements. Given that Gibbins et al. (2001) find that auditors and their clients tend to meet somewhere in the middle, it is likely that some clients expect the auditor to make concessions and that the auditor may need to go into negotiations prepared to do so.

Recent research has begun to examine potential strategies that auditors could employ during the negotiation process. For example, Trotman et al. (2005) examine the impact of intervention methods on auditor-client negotiation. Having auditors enter a mock negotiation where they act as the client, or simply having auditors consider the client's positions prior to the negotiation, enhances their understanding of their counterpart's position which improves the quality of the negotiated outcome. That is, having auditors explicitly consider the positions and concerns of client management resulted in larger client write-downs and increased satisfaction with the outcome, relative to when auditors did not engage in these intervention methods (Trotman et al. 2005).

The Rule of Reciprocation

The *rule of reciprocation* has been found in a variety of settings and is pervasive in all societies (Gouldner 1960; Cialdini 2001). The basic tenet of this societal rule is that if someone provides a person with any type of gift or favor, that person is "obligated" to reciprocate. The reciprocation rule creates an environment, within the negotiation context, that mandates mutual concession. Effective negotiators often rely on reciprocity to create social compliance in their counterparts by offering an initial position greater than their ultimate goal (Cialdini 2001). By making a concession off of the initial position (perhaps in partial fulfillment of a counteroffer), the negotiator can expect a concession from his or her counterpart.

Experimental studies examining negotiation typically conclude that it is more effective to open with a higher initial demand and then make concessions than it is to open with an offer at the level at which one hopes to settle (e.g., Chertkoff and Conley 1967; Komorita and Brenner 1968; Hinton et al. 1974). For example, Komorita and Brenner (1968) compared the strategy of making an initial offer at the level the negotiator expected to settle and remaining steadfastly at that level with the strategy of making greater initial demands, followed by gradual concessions. They demonstrated that the strategy of making concessions achieved higher outcomes than did the strategy of sticking to the initial offer. Similarly, Chertkoff and Baird (1971) found that the greater a negotiator's initial demands, the higher the compliance rate of the opponent and the greater the opponent's concessions. Further, studies have found that relatively small concessions can result in relatively large reciprocations and that those exposed to this strategy did not feel manipulated and were more satisfied with the outcome than when this strategy was not used (Benton et al. 1972; Cialdini and Ascani 1976; Miller et al. 1976).

Recently, research has explored the use of inflated initial demands in an audit context. Ng and Tan (2003) and Bame-Aldred and Kida (2006) provide some evidence that auditors do not strategically inflate the dollar amounts of proposed adjustments in order to be able to later concede (off the inflated values) without reducing the quality of the financial statements. Ng and Tan (2003) suggest the institutional environment of auditing prevents such a strategy. That is, auditors may consider inflated (i.e., inaccurate) dollar amounts on proposed adjustments to be inappropriate and unprofessional. Alternatively, if accuracy is essential, then auditors could use an approach in which insignificant (but accurate with regard to dollar amount) adjustments serve as the initial concession to the client. For example, a recent study suggests that auditors may be more likely to use such a "reciprocity-based" strategy when negotiating with contentious client management and when client retention risk is high (Hatfield et al. 2006a). Our study complements prior research by examining the efficacy of this type of concessionary approach.

Current Regulatory Environment

New regulations recently put forth, such as Statement on Auditing Standards (SAS) No. 89 (AICPA 1999) and the Sarbanes-Oxley Act of 2002, speak to the auditor's responsibility regarding misstatements uncovered during the course of the audit. A key aspect of these changes relates to whether an item is considered inconsequential to financial statement users. Public Company Accounting Oversight Board Auditing Standard No. 2 states, "a misstatement is *inconsequential* if a reasonable person would conclude, after considering the possibility of further undetected misstatements, that the misstatement, either individually or when aggregated with other misstatements, would clearly be immaterial to the financial statements" (PCAOB 2004, paragraph 91) (emphasis in the original). Nine national and international firms, in *A Framework for Evaluating Process/Transaction-Level Exceptions and Deficiencies* (BDO Seidman et al. 2004), define an inconsequential item as being less than 20 percent of overall annual or interim financial statement materiality (assuming no material qualitative factors), and discussions with partners of a Big 4 firm indicate the profession's position is that greater than 1 percent of pretax income would be considered more than inconsequential.

With respect to materiality, Generally Accepted Auditing Standards currently do not provide quantitative guidance. SAS No. 47 (AICPA 1983) states that "the auditor's consideration of materiality is a matter of professional judgment." Staff Accounting Bulletin No. 99 (SEC 1999) advises auditors to consider qualitative factors in materiality judgments (e.g., concealment of unlawful transactions), as well as quantitative factors. The client must

post all of the adjustments that the auditor believes are material before an unqualified opinion can be issued. However, the auditor and client can reach a compromise regarding immaterial adjustments, which allows for the waiving of certain adjustments if they are believed not to significantly affect the fair presentation of the financial statements (Arens et al. 2005). Further, footnote 6 to SAS No. 89 (AICPA 1999) states that the “auditor may designate an amount below which misstatements need not be accumulated. Similarly, the summary of uncorrected misstatements included or attached to the representation letter need not include such misstatements.” Accordingly, when auditors detect misstatements below this self-determined posting threshold, the auditor has the option of waiving the adjustment at the workpaper level or bringing it to the attention of management.

Alternative Auditor Strategies for Negotiation

Posting of Significant Audit Adjustments

Based on discussions with practicing auditors, we identify two negotiation approaches currently available regarding the resolution of audit differences. First, auditors can simply bring to the client only those significant adjustments that they believe should be booked, and then insist that these adjustments be made before offering an unqualified opinion, which we refer to as the “*no-concession*” approach. An alternate approach is one that involves greater disclosure of the audit findings to the client, which we label the “*concession*” approach. With the concession approach, the auditor would bring to the client all the audit differences discovered during the audit (both significant and inconsequential). The auditor would then waive the inconsequential items, which would not materially affect the financial statements. This concession (i.e., overt waiving of certain adjustments) employs the rule of reciprocity to promote cooperation from the client with respect to the posting of significant items. It is important to note that, in either case, the end result is the same. The auditor would have waived the inconsequential items anyway (since they are below the auditor’s posting threshold); the latter approach simply brings to light the waiving of these items.

The above discussion suggests two potential advantages to incorporating a concession approach in audit negotiations. First, the rule of reciprocity suggests that making the concessions (of inconsequential items) transparent increases the willingness of the client to reciprocate and concede (i.e., post) the significant adjustments. Second, Putnam (1990) asserts that increased disclosure (such as disclosing the inconsequential audit differences that will be waived) is a component of integrative (or collaborative) negotiation. Collaborative negotiation environments are likely to result in a more positive negotiation outcome (Putnam 1990; Trotman et al. 2005). Thus, we expect that the use of a concession approach will increase the client’s willingness to post the significant income-decreasing adjustments, relative to a no-concession approach (in which no audit differences are waived in view of the client). The following hypothesis is, therefore, tested:

- H1:** Client managers who are made aware of inconsequential audit differences that have been waived by the auditor will be more willing to post significant income-decreasing audit adjustments than client managers who are unaware of waived inconsequential audit differences.

Client Satisfaction and Retention

Auditors are tasked with ensuring that financial statements are free from material misstatements while at the same time maintaining a functional relationship with their clients. In surveys of chief financial officers, developing good “working chemistry” with the auditor

was cited as a factor important for client satisfaction (*Accounting Today* 1994, 1996). Research has established a link between the quality of the auditor-client working relationship and auditor turnover, with clients indicating a preference for audit firms that are the "best fit" and whose engagement partner has "chemistry" with the client's management (Eichenseher and Shields 1983; McConnell 1984; Fleming 1996; Byrnes 1999; Pandit 1999; Basioudis and Steele 2000). However, in the current audit environment, auditors face increasing expectations with respect to their responsibilities regarding their clients' financial statements. The auditors' approach to negotiation may help them obtain both of these goals. In fact, Benton et al. (1972) and Schindler (1998) demonstrate that a positive "side effect" of negotiators making a concession from a high initial position, beyond improving the negotiated outcomes, is that their negotiation counterparts may actually be more satisfied with the process.

When the auditor uses a reciprocation-based approach in which the waiving of inconsequential audit differences is explicit (i.e., concession approach), the client may view the auditor as taking more of a collaborative role than an adversarial role, resulting in increased satisfaction with the negotiation (Rubin and Brown 1975; Raiffa 1982; O'Connor and Carnevale 1992). Given that Gibbins et al. (2005) report that clients generally view negotiations with auditors as competitive (adversarial), promoting a collaborative environment may be particularly important in a negotiation context. A key component of perceived cooperation/collaboration is the disclosure of information (Putnam 1990). This disclosure is particularly helpful when it demonstrates that the auditor understands the client's point of view (e.g., the client likely would prefer not to post income-decreasing adjustments). Including only the significant audit differences and insisting that they be posted (i.e., no-concession approach) may ultimately result in materially similar financial statements as a concession approach (e.g., auditors can threaten not to provide an unqualified opinion). However, this no-concession approach may appear more adversarial, resulting in decreased client satisfaction and increased potential for losing the client. The discussion above suggests that, relative to an approach of no-concession, a concession approach will help the interpersonal dynamics between the auditor and client management, and in turn, increase client satisfaction and the likelihood of retention. Thus, the following hypotheses are tested:

H2a: Client managers who are made aware of inconsequential audit differences that have been waived will be more satisfied with the auditor than client managers who are unaware of waived inconsequential audit differences.

H2b: Client managers who are made aware of inconsequential audit differences that have been waived will be more likely to support retaining the audit firm than client managers who are unaware of waived inconsequential audit differences.

III. EXPERIMENT 1: CLIENT MANAGEMENT

Experiment 1, conducted in two parts (1A and 1B), examines the judgments of controller/CFO participants. Experiment 1A considers the efficacy of a concession approach when brought to bear in a negotiation context where there are significant *objective* adjustments that the auditor wants the client to post. However, *subjective* adjustments are typically more contentious and more likely to be waived by the auditor (e.g., Braun 2001; Wright and Wright 1997). Thus, through experiment 1B, we extend this investigation to a context in which the significant adjustment in question is subjective.

Experiment 1A

Client Manager Participants

Controllers and CFOs are often the client management with whom the external auditors interact to resolve audit differences and, accordingly, serve as participants in our study. This is consistent with prior academic and practitioner research investigating client satisfaction and client perceptions of the audit team/firm (e.g., *Accounting Today* 1992, 1994, 1996; Behn et al. 1997; Behn 1999; Gibbins et al. 2005). One hundred twenty-four controllers and CFOs (hereafter client managers) participated in the study.⁴ Participants had significant experience in resolving proposed audit adjustments with auditors (mean of more than six years of experience). Participants were randomly assigned to one of three treatment groups discussed below.⁵

Task and Procedure

We conducted the experiment in three phases in order to simulate the negotiation process (see Figure 1). In Phase 1, we provided participants a description of a hypothetical company (including financial statements) and asked them to assume the role of management (controller).⁶ Participants were also asked to assume that they would be in communication with the external auditors (through the hypothetical audit partner in charge of the engagement), who were in the process of completing fieldwork and had come up with a preliminary list of proposed adjustments that they would like client management to consider. Participants emailed a researcher after familiarizing themselves with the Phase 1 materials, which initiated Phase 2 of the experiment. In Phase 2, participants received (via email) the audit partner's preliminary list of proposed audit adjustments. Participants were informed by the partner's correspondence that the list was not yet finalized, as the audit team was still in the process of completing fieldwork. This list included two significant (clearly material) income-decreasing adjustments for all participants (see Panel A of Figure 2).⁷ These two significant adjustments related to sales and to depreciation. Depending on treatment condition (discussed below), the list also included five, two, or no clearly inconsequential income-decreasing adjustments.

Of the five inconsequential items (that could be included on the list), three related to estimates. For two of these proposed adjustments, the client's figures fell within the auditor's

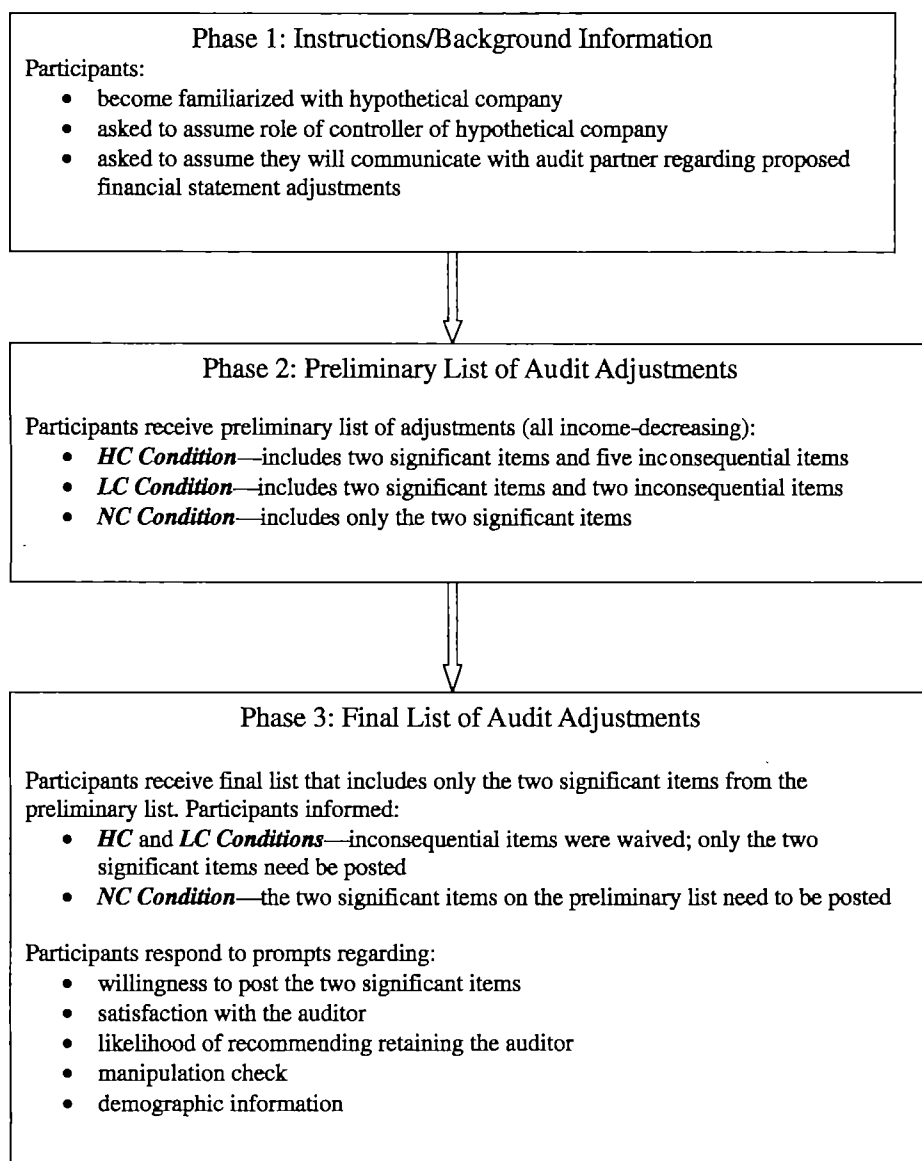
⁴ Out of 1,000 letters requesting participation in the study (addressed to controllers/CFOs randomly selected from a membership list provided by the Institute of Management Accountants), 80 letters were returned because of an incorrect address, and six respondents indicated that they could not participate in the study because they were retired, ill, or unfamiliar with the issues. A total of 124 controllers/CFOs agreed to participate, representing a 14 percent response rate (124 useable responses out of 914 potential responses). This response rate is consistent with prior studies involving CFO/controller participants (e.g., Gibbins et al. 2005; Graham and Harvey 2001). Comparisons of early and late responders indicate no significant difference, suggesting that nonresponse bias does not drive our results. Data were collected between November 2002 and January 2003.

⁵ There were no significant differences ($p > .10$) for participants across the experimental conditions for any of the demographic variables (e.g., experience, whether their company is publicly traded, their company's revenues). Mean experience in current position was 5.9 years, 25 percent worked for a publicly traded company, 42 percent were CPAs, and mean annual revenues was \$290,725,000.

⁶ In the current environment, CFOs are often involved in these negotiations in addition to the controller. Thus, the participants (who were asked to assume the role of controller) were provided with CFO input. Case materials indicate that the hypothetical CFO "would like to issue the financial statements 'as they are' and would prefer to book as few audit adjustments as possible."

⁷ Financial statement audits typically result in the detection of two or more misstatements (Kreutzfeldt and Wallace 1986; Wright and Ashton 1989), and thus, following Braun (2001), our study uses two material proposed adjustments. Further, by considering managements' likelihood to post two separate adjustments, we reduce the possibility that results are dependent upon a specific adjustment. Seven audit experts determined that these material adjustments were significant and would need to be posted in order for an auditor to issue an unqualified opinion. Experts were three practicing auditors and four academics all with significant audit experience.

FIGURE 1
Outline of Experiment 1A Procedure



acceptable range (which the auditor disclosed to the client), and the auditor proposed an adjustment to bring the balance of the account closer to the high end of the range. As any amount within the range is acceptable under GAAP, these two proposed adjustments could be waived without jeopardizing the integrity of the financial statements. For the third inconsequential proposed adjustment relating to an estimate, the client's figure fell just short (0.0004 percent of sales, 0.008 percent of pretax income, and 0.01 percent of net income, with no effect on earnings per share) of the lower-end of the auditor's acceptable range.

FIGURE 2
Significant Items Proposed by Hypothetical Auditor in Experiments 1 and 2

Panel A: Significant Items Proposed in Experiments 1A and 2

Dr. Sales Revenue	3,520,000	
Cr. Accounts Receivable		3,520,000
and		
Dr. Inventory	1,676,000	
Cr. Cost of Sales		1,676,000

To properly record sales in the correct period. Per sales-cutoff tests, the auditors believe that \$3,520,000 of sales included in current year's sales were actually sales of the subsequent year. The cost of those sales, also recorded in the wrong period, is \$1,676,000.

Dr. Depreciation Expense	2,495,000	
Cr. Accumulated Depreciation		2,495,000

To increase the depreciation expense for the current year. (Depreciation expense is included as part of Selling, general and administrative expenses on the Income Statement.) Per review of the fixed asset records, the auditors believe that depreciation expense for the current year was miscalculated.

Panel B: Significant Item Proposed in Experiment 1B

Dr. Warranty Expense	2,495,000	
Cr. Liability Under Warranties		2,495,000

To increase the warranty expense for the current year. Wilson Electronics offers a two-year warranty on all of their products. Wilson acquired a new product line during the year and applied the same percentage as applied to its other product lines. However, due to substantial differences in quality control for this new product line, the audit team has determined that the applied percentage for this line is too low and thus the warranty liability is understated. Per review of current-year sales and returns for the new product line and all other product lines, the auditors believe the Liability Under Warranties account balance should be approximately \$8,100,000. It is currently \$5,605,000 (it is included as part of Accrued Liabilities on the Balance Sheet). (Warranty Expense is included as part of Cost of Sales on the Income Statement.)

The two remaining inconsequential proposed adjustments were not estimated figures and (combined) totaled 0.01 percent of sales, 0.2 percent of pretax income, and 0.4 percent of net income, with no effect on earnings per share. Accordingly, as waiving these items has an inconsequential effect on earnings per share/net income, the auditor is not required to report these inconsequential items under the current regulatory environment.⁸

After receiving a participant's emailed reply to Phase 2, we sent a second email to the participant, beginning Phase 3 of the experiment.⁹ This second email included the final list of proposed adjustments (which was identical for all participants in all conditions), consisting only of the two significant adjustments. After examining the final list of adjustments, participants were asked to indicate how willing they were to post the two significant adjustments. Participants also indicated their satisfaction with the audit partner's performance during the resolution of audit differences and how likely they were to recommend using the same auditing firm next year. Finally, participants responded to a manipulation check and demographic questions.

There were three experimental conditions: two involved an explicit concession approach while another did not involve explicit concession. The manipulation occurred primarily in Phase 2. In the No-Concession (NC) condition, participants received only the two significant adjustments on the Phase 2 preliminary list of audit adjustments. Participants in the High-Concession (HC) condition received the five inconsequential adjustments in addition to the two significant adjustments. The only difference between the Low-Concession (LC) and HC conditions was in the number of *inconsequential* adjustments received. Specifically, two inconsequential items (the non-estimated items) were received by participants in the LC condition versus five for the HC condition. In Phase 3, participants in all conditions received a final list of adjustments, which included only the two significant items. The HC (LC) group was provided with the following communication from the audit partner regarding the partner's concession of the inconsequential items: "I will waive five (two) of the initial proposed adjustments. Therefore, you will only need to post two adjustments instead of the initial list I provided you with seven (four) adjustments." Thus, in the HC (LC) condition, the partner's actions resulted in five (two) waived items, which were waived in full view of the client managers. In contrast, participants in the NC condition were not aware of any concessions by the partner.

Experiment 1A Results

Experiment 1A employs a 1×3 between-participants design. For clarity of presentation, the discussion of results focuses on the hypotheses, which compare concession approaches (HC and LC) to a no-concession approach (NC). We also compare the High- and Low-Concession conditions to explore whether the level of concession (i.e., the quantity of waived items of which the client manager is aware) affects managers' judgments and perceptions. Results regarding the latter comparison are presented immediately following those relating to the hypotheses in the "High- versus Low-Concession" section. A manipulation check revealed that all participants in the HC and LC conditions understood that five and

⁸ The inconsequential proposed adjustments were determined to be "clearly inconsequential," both individually and in the aggregate, by seven audit experts. It was also determined by these experts that the inconsequential adjustments were small enough in magnitude that they would need neither to be brought to the attention of the audit committee nor included in the management representation letter. Accordingly, these inconsequential proposed adjustments could be waived by the auditor without ever having been brought to the attention of the client.

⁹ There was a three-business-day lag between receipt of Phase 2 materials (from participants) and distribution of Phase 3 materials (to participants) to simulate the time it might take to finish audit fieldwork and prepare the final list of proposed audit adjustments.

two items, respectively, had been waived. Nine participants in the NC condition responded incorrectly to the manipulation check question (i.e., failed to recognize *no* items had been waived). Removing these participants from the analysis does not change any of the inferences drawn.

Willingness to post significant items. Recall that, in all conditions, the auditor's final request is that only the two significant adjustments be posted. Hypothesis 1 predicts that participants in the HC and LC conditions (in which the auditor discloses five or two inconsequential items, respectively, to participants before waiving them) will be more willing to post the two significant income-decreasing adjustments than participants in the NC condition (in which participants are unaware of any waived items). Participants recorded their willingness to post the adjustments on ten-point scales, where 1 = extremely unwilling and 10 = extremely willing. Table 1 reports group means and the results of the planned contrasts used to test H1.¹⁰ The mean willingness to post the significant Sales adjustment for the NC group is 6.40, which is significantly less than both the HC and LC group means (7.87, p

TABLE 1
H1: Client Managers' Willingness to Post Significant Adjustments

Panel A: ANOVA Results for Willingness to Post Significant Adjustments

<u>Dependent Variable^a</u>	<u>NC Group (n = 43)</u>	<u>LC Group (n = 43)</u>	<u>HC Group (n = 38)</u>	<u>F-Statistic</u>	<u>p-value^b</u>
Sales Adjustment					
Mean	6.40	8.14	7.87	7.46	<.001
(Std. Dev.)	(2.70)	(1.89)	(2.03)		
Depreciation Adjustment					
Mean	5.98	7.26	7.13	2.84	.062
(Std. Dev.)	(2.96)	(2.70)	(2.46)		

Panel B: Contrast Tests between Groups

	<u>F-Statistic</u>	<u>p-value^b</u>
Sales Adjustment		
NC Group versus LC Group	13.02	<.001
NC Group versus HC Group	8.71	.002
LC Group versus HC Group	0.30	.588
Depreciation Adjustment		
NC Group versus LC Group	4.74	.016
NC Group versus HC Group	3.63	.025
LC Group versus HC Group	0.04	.838

^a Two dependent variables were included in the analysis of the three treatment groups: willingness to post the significant Sales Adjustment, and willingness to post the significant Depreciation Adjustment. Participants recorded their willingness to post each adjustment on ten-point scales where 1 = extremely unwilling and 10 = extremely willing.

^b For Panel A, p-values are based on two-tailed tests. Other than LC versus HC, p-values for Panel B are based on one-tailed tests since expectations regarding mean differences were directional.

¹⁰ Since the hypotheses in this study examine the effect of the treatment groups across multiple dependent variables, multiple analysis of variance (MANOVA) was performed. Results were significant at $p < .01$, allowing us to consider univariate tests of the hypotheses. Shapiro-Wilk tests indicate that some of the data reported in this study violate the assumption of normality. Therefore, nonparametric tests were also performed (Kruskal-Wallis and Mann-Whitney tests), which resulted in nearly identical significance levels.

= .002 and 8.14, $p < .001$, respectively). Similar results are obtained for the significant depreciation adjustment, with participants indicating a mean willingness of 5.98 for the NC group versus 7.13 for the HC group ($p = .025$) and 7.26 for the LC group ($p = .016$).¹¹ These results provide support for H1.

Client satisfaction and retention. Hypotheses 2a and 2b predict client satisfaction and retention will be higher for the HC and LC groups than for the NC group. Participants recorded their satisfaction with the auditor, with respect to the disposition of audit adjustments, on a ten-point scale (where 1 = extremely dissatisfied and 10 = extremely satisfied), and their likelihood of retaining the auditor on a ten-point scale (where 1 = extremely unlikely and 10 = extremely likely). Group means and the results of planned comparisons are provided in Table 2. Client satisfaction for both the HC and LC groups (means = 6.74 and 6.61, respectively) is significantly greater than that reported by the NC group (mean = 5.47, $p = .011$ for HC versus NC and $p = .016$ for LC versus NC). We find similar results for client retention, where the HC and LC means (6.61 and 6.58, respectively) are

TABLE 2
H2: Client Managers' Assessment of Client Satisfaction and Retention

Panel A: ANOVA Results for Client Satisfaction and Retention

<u>Dependent Variable</u>	<u>NC Group (n = 43)</u>	<u>LC Group (n = 43)</u>	<u>HC Group (n = 38)</u>	<u>F-Statistic</u>	<u>p-value^c</u>
Client Satisfaction					
Mean ^a	5.47	6.61	6.74	3.45	.035
(Std. Dev.)	(2.89)	(2.15)	(2.19)		
Client Retention					
Mean ^b	5.31	6.58	6.61	3.82	.025
(Std. Dev.)	(2.70)	(2.40)	(2.13)		

Panel B: Contrast Tests between Groups

	<u>F-Statistic</u>	<u>p-value^c</u>
Client Satisfaction		
NC Group versus LC Group	4.70	.016
NC Group versus HC Group	5.50	.011
LC Group versus HC Group	0.06	.808
Client Retention		
NC Group versus LC Group	5.74	.009
NC Group versus HC Group	5.59	.010
LC Group versus HC Group	0.00	.966

^a The means represent the participants' responses to the question: "How satisfied are you with the performance of the audit partner?" Responses were recorded on ten-point scales where 1 = extremely dissatisfied and 10 = extremely satisfied.

^b The means represent the participants' responses to the question: "How likely are you to recommend using this firm next year?" Responses were recorded on ten-point scales where 1 = extremely unlikely and 10 = extremely likely.

^c For Panel A, p-values are based on two-tailed tests. Other than LC versus HC, p-values for Panel B are based on one-tailed tests since expectations regarding mean differences were directional.

¹¹ If the response scale is dichotomized at the midpoint, the HC and LC groups are significantly more likely to be willing to post a significant item (78 percent and 81 percent, respectively) than the NC group (65 percent, $p = .040$ for HC versus NC and $p = .008$ for LC versus NC).

significantly greater than the mean for the NC group (5.31, $p = .010$ for HC versus NC and $p = .009$ for LC versus NC).¹² Thus, these results are supportive of H2a and H2b.

High- versus low-concession. Prior negotiation research suggests that higher initial positions lead to higher concessions on the part of the opponent (Chertkoff and Baird 1971). However, the rate of concession does not seem to be as important a factor in the level of reciprocating concessions made by the opponent (e.g., Liebert et al. 1968; Pruitt and Drews 1969; Benton et al. 1972). Thus, it is unclear as to whether, in the context of negotiating proposed audit adjustments, the quantity of waived items (of which the client is made aware by the auditor) will affect client managers' willingness to post the remaining items. It may be that the greater the number of disclosed (and subsequently waived) inconsequential audit differences, the more cooperative the client views the auditor. This, in turn, may lead to increased client satisfaction and likelihood of retaining the audit firm.

In order to explore the potential relationship between the *extent* of disclosure/concession on the part of the auditor and client judgments and perceptions, we compare the High- and Low-Concession conditions (i.e., five versus two inconsequential items disclosed and subsequently waived). Results indicate that the HC and LC groups' mean willingness to post the significant Sales (7.87 and 8.14, respectively, $p = .588$) and Depreciation adjustments (7.13 and 7.26, respectively, $p = .838$) are not significantly different (see Table 1). This pattern of results suggests that, while the use of a concession approach (either high or low concession) appears to encourage the client to be more cooperative in the posting of the significant adjustments, increasing the number of adjustments included in the auditor's initial position does not. That is, it does not appear that the number of items waived is as important as the fact that some items are waived. A similar pattern of results is found for the client satisfaction and retention variables (see Table 2).

Experiment 1B

Results of experiment 1A are obtained using significant items that are relatively objective in nature (involving sales cutoff and depreciation expense calculation issues). However, auditors may find greater resistance from clients when the significant items are more subjective in nature, as subjective items are often more contentious and more difficult to convince the client to record (Wright and Wright 1997). Consequently, a concession approach may be even more useful in these circumstances and, if effective, may have direct positive implications for the quality of the financial statements.

Recent research suggests that, in addition to waiving objective adjustments, auditors waive subjective adjustments as well. For example, auditors have been found to waive both subjective and objective adjustments if they are quantitatively immaterial (even if they are qualitatively material) and if the quantitative materiality approach utilized (i.e., balance sheet approach versus income statement approach) makes an adjustment appear less material (Libby and Kinney 2000; Nelson et al. 2005; Hatfield et al. 2006b). In fact, several studies indicate that auditors are more likely to waive subjective items than objective items (e.g., Wright and Wright 1997; Braun 2001; Nelson et al. 2002). While these findings suggest that *auditors* are willing to consider waiving subjective adjustments, little is known about how the subjectivity of proposed adjustments affects *client manager* negotiating positions.

¹² If the response scale is dichotomized at the midpoint, the HC and LC groups are significantly more likely to retain the auditor (78 percent and 70 percent, respectively) than the NC group (49 percent, $p = .020$ for HC versus NC and $p = .025$ for LC versus NC).

With experiment 1B, we extend the findings of experiment 1A regarding the effectiveness of a concession approach to a context in which the significant adjustment in question is subjective. We utilize two conditions (HC_s and NC_s) that differ from experiment 1A conditions HC and NC only with regard to the significant adjustments (as with the HC and NC conditions in experiment 1A, five inconsequential items were given in the HC_s condition and none in the NC_s condition). For HC_s and NC_s, a single and more subjective significant item was brought to the client by the audit partner, in place of the more objective significant items in experiment 1A (see Figure 2). The significant item involves a recently acquired product line for which the auditor's estimate of warranty expense differs from the client's and, thus, likely presents a more contentious setting. All other aspects of experiment 1B are identical to experiment 1A (i.e., administration, participant pool, task, and procedures).¹³

The results of experiment 1B (see Table 3) are consistent with those obtained in experiment 1A. Participants in the HC_s condition are more willing to post the significant adjustment (mean = 7.23, *n* = 13) than participants in the NC_s condition (mean = 4.25, *n* = 12, *p* < .001). Similarly, participants are more satisfied with the auditor and more likely to recommend retaining the auditor in the HC_s condition (means = 6.38 and 6.90,

TABLE 3
ANOVA Results for Experiment 1B

Panel A: ANOVA Results for Willingness to Post Significant Subjective Adjustment

	NC_s Group (<i>n</i> = 12)	HC_s Group (<i>n</i> = 13)	F-Statistic	p-value^d
Mean ^a	4.25	7.23	16.23	<.001
(Std. Dev.)	(2.26)	(1.36)		

Panel B: ANOVA Results for Client Satisfaction and Retention

Dependent Variable	NC_s Group (<i>n</i> = 12)	HC_s Group (<i>n</i> = 13)	F-Statistic	p-value^d
Client Satisfaction				
Mean ^b	4.00	6.38	9.82	.002
(Std. Dev.)	(2.00)	(1.80)		
Client Retention				
Mean ^c	4.08	6.90	9.05	.003
(Std. Dev.)	(2.27)	(2.43)		

^a Participants recorded their willingness to post each adjustment on ten-point scales where 1 = extremely unwilling and 10 = extremely willing.

^b The means represent the participants' responses to the question: "How satisfied are you with the performance of the audit partner?" Responses were recorded on ten-point scales where 1 = extremely dissatisfied and 10 = extremely satisfied.

^c The means represent the participants' responses to the question: "How likely are you to recommend using this firm next year?" Responses were recorded on ten-point scales where 1 = extremely unlikely and 10 = extremely likely.

^d All reported p-values are based on one-tailed tests since expectations regarding mean differences were directional.

¹³ Controller participants were taken from the same pool of participants as, and are demographically similar to, those in experiment 1A (all *p* > .30). The response rate was also similar (15 percent). Three participants in the NC_s condition and one in the HC_s condition failed the manipulation check. Removing these participants from the analysis does not alter our conclusions. Data were collected late in 2005.

respectively) than in the NC_s condition (means = 4.00, $p = .002$ and 4.08, $p = .003$, respectively). This data provides evidence that the concession approach considered in this study can also improve the client's willingness to post more subjective, and possibly contentious, audit adjustments while improving client satisfaction and retention.

Further, since the *amounts* of subjective adjustments are frequently negotiated (e.g., Beattie et al. 2000; Gibbins et al. 2001), we also collect information regarding client manager participants' negotiating ranges. In our setting, this range is bound by a participant's initial position (i.e., how much of the proposed adjustment a participant initially indicates he or she is willing to post) and his or her negotiation limit (i.e., the highest amount a participant is willing to post before negotiations break down) (Pruitt and Carnevale 1993). Prior research demonstrates that more ambitious initial positions and negotiation limits lead to better outcomes for the negotiator (Ben-Yoav and Pruitt 1984; Kelly et al. 1967). Thus, by collecting participants' negotiation ranges, we gain some insight into how the auditor's use of the concession approach may influence the magnitude of the negotiated amounts included in financial statements. In the current scenario, the auditor proposes a \$2,495,000 increase in warranty expense, so a higher negotiated number results in lower net income (i.e., the client prefers a lower negotiated value for the adjustment). Use of the concessionary approach (by the hypothetical auditor) significantly increases client manager participants' initial positions (means: HC_s = \$1,317,308; NC_s = \$518,182; $p = .009$) as well as their negotiation limits (means: HC_s = \$2,170,000; NC_s = \$1,331,136; $p < .001$). These findings suggest that the concessionary approach results in client manager initial positions and negotiation limits that will lead to more conservative values in the financial statements.

IV. EXPERIMENT 2: AUDITORS

Experiment 2 explores auditors' perceptions of the use of a concession approach. In this experiment, auditor participants are presented with a scenario in which a hypothetical auditor uses (does not use) such a strategy. A determinant of strategy use is the expectation that benefits will accrue to the individual employing the strategy. To provide insight into perceived strategy benefits, experiment 2 examines the effect of a concession approach on auditor perceptions of client satisfaction and retention.

Auditor Perceptions

The results of experiment 1 suggest that a concession approach is effective, not only as a means to increase the clients' willingness to post significant adjustments, but also for improving client satisfaction and the likelihood of client retention. In light of these results, it is important to investigate auditors' perceptions regarding this type of approach. That is, the results of experiment 1 imply that a concession approach may be helpful in reducing client pressure on the auditor to concede significant proposed adjustments, while maintaining/improving the auditor-client relationship as well as the quality of the financial statements. However, if auditors do not perceive this approach to produce such benefits, then it is unlikely they will consider it. In addition, auditors may feel that it is inappropriate to alter their approach toward resolving audit differences with the client. Consistent with a recent call for research examining auditor negotiation strategy use (Ng and Tan 2003), we examine, through experiment 2, how auditors view the use of this approach with respect to its effect on client satisfaction and retention.

As previously discussed, Gibbins et al. (2001) note that auditors regard negotiation as a frequent and important part of their responsibilities and part of the service they provide to the client. In addition, prior research suggests that experience in a negotiation setting leads to increased use of a reciprocation-based approach (Kelley 1966; Thompson 1990).

Thus, as experienced negotiators, auditors may be inclined to utilize a strategy that draws upon reciprocation when they deem it appropriate for the negotiation at hand. While Gibbins et al. (2001) do not explore the strategy of disclosing an initial position that is greater than the ultimate goal, they report that the outcome of most negotiations lies somewhere between the initial position of the auditor and that of the client. However, as previously mentioned, Ng and Tan (2003) find that auditors do *not* inflate the dollar amount of proposed adjustments in anticipation of negotiations (i.e., do not employ a reciprocation-based approach in that manner). Auditors in their study tended to base their initial recommendations purely on what they considered the most appropriate dollar amount. Ng and Tan (2003) suggest that auditors would consider inflated (i.e., inaccurate) dollar amounts on proposed adjustments to be inappropriate and unprofessional under existing auditing standards and guidelines. Alternatively, if accuracy is essential, then auditors could use a concession approach in which insignificant (but accurate with regard to dollar amount) adjustments serve as the initial concession required for a reciprocation-based approach. Thus, we explore auditors' perceptions regarding a concessionary approach with respect to its effect on client satisfaction and retention.

Auditor Task and Procedure

Participants were 36 audit managers and partners from large, international public accounting firms who had, on average, about 10 years of experience.¹⁴ The experiment was conducted using a computer-based instrument. Participants were asked to consider an interaction between a hypothetical auditor and client regarding the resolution of audit differences. The interaction was presented as a brief scenario in which the participant was informed that the hypothetical audit team had compiled a list of seven proposed audit adjustments. On the list, two of the adjustments were significant (i.e., clearly material; see Panel A of Figure 2) and five were clearly inconsequential to financial statement users (both separately and in aggregate).¹⁵ Participants were informed that the client is generally reluctant to post audit adjustments. They were then presented with the hypothetical auditor's approach to resolving the audit differences (the manipulation). As with client manager experiment 1A, we employ a 1×3 experimental design with two concession strategy conditions and a no-concession strategy condition. Auditor negotiation strategy was manipulated between subjects, with participants randomly assigned to one of the three strategy conditions.

The No-Concession (auditor) scenario provided to participants in the NC_A condition involved a hypothetical auditor who decides to waive all five inconsequential adjustments without bringing them to the client's attention, such that the client in the scenario is unable to observe the waiving of these adjustments. The auditor in the scenario then brings only the two significant adjustments to the client's attention and insists that the client post both. For the High-Concession (HC_A) condition, the hypothetical auditor discloses all seven items to the client, but requires the client to post only the two significant items (while informing the client that the five inconsequential items will be waived). The Low-Concession (LC_A)

¹⁴ Auditor participants were obtained through contacts at participating firms. Contacts were provided with the appropriate number of instruments based on the number of participants they were able to obtain. There were no significant differences ($p > .30$) for auditor participants across the experimental conditions for any of the demographic variables (e.g., position in firm, years of experience, experience resolving audit differences, familiarity with relevant authoritative guidance) and no firm or staff level effects ($p > .50$) on the dependent variables. Data were collected early in 2004.

¹⁵ The seven income-decreasing items were identical to the seven items used in the HC condition of client manager experiment 1A.

and HC_A conditions are identical except that the auditor presented in the LC_A scenario chooses to disclose (and subsequently waive) only two of the five inconsequential items. Participants were asked to indicate their perceptions regarding the level of client satisfaction and likelihood that the client would retain the audit firm, given the negotiation strategy of the hypothetical auditor presented in the scenario.

Auditor Results

To explore auditor perceptions, we asked participants (post-experimentally) whether there are circumstances under which it would be appropriate to adjust their approaches to resolving audit differences. Thirty-two out of 36 participants responded that it is appropriate to adjust their approach toward the resolution of audit differences depending on the nature and characteristics of the client. The same proportion of participants felt it is appropriate to adjust their approach if it facilitates the posting of significant adjustments. Thus, it appears the majority of participants believe that there are circumstances where it would be acceptable to alter their negotiation tactics.

Participants also believe that, by altering their approach toward greater disclosure of waived inconsequential audit differences, auditors can improve client satisfaction and retention (see Table 4). Participants recorded their perceptions of: (1) client satisfaction on a ten-point scale (1 = very dissatisfied to 10 = very satisfied) and (2) change in likelihood

TABLE 4
Auditors' Perceptions of Client Satisfaction and Retention

Panel A: ANOVA Results for Auditors' Perceptions

<u>Dependent Variable</u>	<u>NC_A Group (n = 12)</u>	<u>LC_A Group (n = 12)</u>	<u>HC_A Group (n = 12)</u>	<u>F-statistic</u>	<u>p-value^c</u>
Perception of Client Satisfaction					
Mean ^a	4.33	6.58	7.58	33.25	<.001
(Std. Dev.)	(1.07)	(1.31)	(1.51)		
Perception of Likelihood of Retaining Audit Firm					
Mean ^b	-1.00	1.17	2.25	32.86	<.001
(Std. Dev.)	(1.28)	(1.12)	(1.77)		

Panel B: Contrast Tests between Groups

	<u>F-statistic</u>	<u>p-value^c</u>
Client Satisfaction		
NC _A Group versus LC _A Group	17.74	<.001
NC _A Group versus HC _A Group	37.02	<.001
LC _A Group versus HC _A Group	3.50	.035
Client Retention		
NC _A Group versus LC _A Group	14.10	<.001
NC _A Group versus HC _A Group	37.73	<.001
LC _A Group versus HC _A Group	3.53	.035

^a The means represent the participants' perception of client satisfaction ("with respect to the resolution of audit differences") that was measured on a ten-point scale where 1 = very dissatisfied and 10 = very satisfied.

^b The means represent the participants' perception of the likelihood of client retention which was measured on an 11-point scale where -5 = decreased likelihood of client retention, +5 = increased likelihood of client retention, and 0 = no change.

^c For Panel A, p-values are based on two-tailed tests. Other than LC_A versus HC_A, p-values for Panel B are based on one-tailed tests since expectations regarding mean differences were directional.

of client retention on an 11-point scale (-5 = decreased likelihood of client retention, 0 = no change, and $+5$ = increased likelihood of client retention). The mean perceived satisfaction score for the HC_A condition (7.58) is significantly greater than that reported for the NC_A condition (4.33, $p < .001$). Similar results are obtained with the mean perceived likelihood of retention scores (2.25 and -1.00 , respectively, $p < .001$).

Results also indicate that auditor participants believe clients will respond more favorably to Low-Concession (LC_A) of inconsequential items than to No-Concession (NC_A), but not as favorably as to High-Concession (HC_A). With respect to perceptions of client satisfaction, auditor participant means for the LC_A condition were significantly higher than those reported for the NC_A condition (6.58 versus 4.33, $p < .001$), but significantly lower than those for the HC_A condition (6.58 versus 7.58, $p = .035$). These results suggest that auditors perceive that the number of inconsequential items the client observes the auditor waive is positively related to the client's satisfaction. Similar results are found for the client retention variable (LC_A mean = 1.17 versus -1.00 and 2.25 for NC_A and HC_A , $p < .001$ and $p = .035$, respectively).

It is interesting to note that, while the quantity of items waived in view of client management did not influence manager perceptions, it did affect the auditors' perceptions. Given that client managers are only aware of the items brought to their attention, they are unable to discern whether the audit partner has disclosed all of the inconsequential differences uncovered by the audit team (e.g., the manager may assume that the audit partner has disclosed all differences). Thus, they may have viewed both the high- and low-concession approaches as, simply, concessionary. In contrast, auditor participants were aware of all audit differences and, in turn, that the hypothetical auditor in the low-concession scenario did not disclose all differences to the client. As a result, they may have discounted the appeal of the low-concession approach.

V. DISCUSSION AND CONCLUDING REMARKS

Auditors are tasked with ensuring that financial statements are free from material misstatements while at the same time maintaining a functional working relationship with client management who have responsibility for creating the financial statements and have substantial influence over issues such as auditor retention and compensation (KPMG 2004). The auditors' approach to negotiation may help them obtain both of these goals. In this study we examine how auditor strategy during negotiations with the client over the resolution of proposed financial statement adjustments may affect the client's willingness to post significant audit adjustments, as well as client satisfaction and retention.

We investigate an approach that draws upon the societal rule of reciprocation. In an audit context, a reciprocation-based strategy could involve an approach of "concession," which makes the waiving of inconsequential audit differences transparent. Specifically, the auditor could choose to disclose to the client the inconsequential audit differences discovered during the engagement (which the auditor could have chosen to waive without bringing to the client's attention), and subsequently waive these inconsequential differences. Negotiation theory suggests that making the waiving process more transparent, by disclosing the adjustments before waiving them, may result in a more collaborative negotiation with the client causing them to be more agreeable toward posting significant items to the financial statements. We examine, from both the client and auditor perspectives, the effects of a concession approach by the auditor during the resolution of audit differences relative to a strategy in which the client is unaware of inconsequential items that the auditor waives (i.e., a strategy of "no-concession" in which the auditor starts with the desired end position and sticks to it).

The results of experiment 1A indicate that auditor negotiation strategy can affect the resolution of proposed adjustments to the financial statements, as well as client perceptions regarding the resolution process. Specifically, client managers (controllers and CFOs) are more willing to post significant adjustments if the auditor includes and subsequently waives some inconsequential adjustments (concession approach), relative to an approach of no-concession. In addition, client managers report greater satisfaction and likelihood of recommending retention of the auditor when exposed to a concession approach, compared to a no-concession approach. Experiment 1A utilizes significant adjustments that are relatively objective in nature. With experiment 1B, we consider the effect of a concession approach when more contentious subjective adjustments are at stake. Results again show that client managers are more willing to post a significant adjustment, are more satisfied with the auditor, and are more likely to recommend retaining the auditor when a concession approach is employed. Further, when exposed to such a strategy, client managers tend to take less aggressive negotiation postures (i.e., more conservative initial offers and negotiation limits). Overall, experiments 1A and 1B provide evidence that a concession approach has the potential to improve financial statement quality by increasing the likelihood that client managers will agree to post significant proposed audit adjustments, as well as by increasing the related dollar amount of the adjustment the manager is willing to accept.

While a concession approach appears to produce a more collaborative environment that results in better-negotiated outcomes, auditors' perceptions may lead them to choose not to consider it. Through experiment 2, utilizing auditors as participants, we examine the other side of the negotiation table to explore how auditors view the efficacy of this approach with respect to its effect on client satisfaction and retention. Results indicate that the majority of auditor participants view altering their negotiation tactics as appropriate depending on the nature and characteristics of the client and if it facilitates the client posting significant adjustments. Similar to the results obtained with client management (experiment 1), auditors perceive that both high- and low-concession approaches can lead to greater client satisfaction and retention relative to a no-concession approach.

The results of this study have implications for practice and future research. With respect to practice, our results suggest that the auditor's negotiation strategy matters. Specifically, in this case, "concession" approaches appear to lead to increased client satisfaction and retention and better negotiated outcomes. Thus, such an approach may be helpful in reducing client pressure on the auditor to concede on borderline significant and more subjective adjustments and, likewise, in reducing client resistance to the auditor's position. Further, the fact that auditors have been found to waive adjustments or change estimates in concession to client demands (e.g., Gibbins et al. 2001) could be part of a negotiation strategy and may actually result in positions consistent with auditors' initial (but unstated) position. That is, the fact that an auditor may make concessions to a client does not necessitate that the resulting financial statements differ from the auditor's initial intended outcome and may, in fact, result in higher quality financial statements if it facilitates the posting of significant adjustments. Future research might be aimed at determining the purpose of auditor concessions and their impact on audit quality. This research could investigate and compare auditors' intended outcomes with the actual outcome of the negotiation. While it is likely that auditors utilize a variety of approaches when negotiating with the client to resolve audit differences, they do appear to recognize certain benefits of a concession approach. Further research could be designed to determine the conditions under which auditors are likely to use such an approach.

It is important to note that our study was conducted electronically. While a matching of controller/CFO participants with an in-person negotiation counterpart is logistically challenging, it would likely improve external validity as such auditor-client negotiations are often conducted in person (Gibbins et al. 2001). Also, this study presents results obtained from only a single negotiation context. For example, in our study there are multiple audit differences (all income-decreasing), the auditor waives clearly immaterial differences without bringing them to the attention of the audit committee, and the client prefers not to post adjustments. Future research could investigate other auditor-client negotiation settings to broaden the generalizability of these findings. Further, our study takes place over a single period. The negotiation literature suggests that utilizing a concessionary approach in one period can lead to a more collaborative environment, which can improve relations between the negotiators and, in turn, improve the environment of future negotiations (e.g., Putnam 1990; O'Connor and Carnevale 1992; Schindler 1998). However, it is possible that the strategy considered in this study becomes less effective over multiple periods of use (i.e., concessions by the auditor in one period might create client expectations of greater auditor concessions in future periods). Future research could explore the effect of a concession approach in multiperiod negotiation settings. Such research will further our understanding of the impact of auditor-client interactions on the resulting financial statements.

REFERENCES

- Accounting Today*. 1992. 5 top firms accept CAP awards. (November 9): 30.
- . 1994. Andersen tops CFO ratings. (March 14): 5.
- . 1996. Ernst captures crown in client satisfaction survey. (April 8–21): 3, 38.
- American Institute of Certified Public Accountants (AICPA). 1983. *Audit Risk and Materiality in Conducting an Audit*. Statement on Auditing Standards No. 47. New York, NY: AICPA.
- . 1999. *Audit Adjustments*. Statement on Auditing Standards No. 89. New York, NY: AICPA.
- Antle, R., and B. Nalebuff. 1991. Conservatism and auditor-client negotiations. *Journal of Accounting Research* 29: 31–54.
- Arens, A., R. J. Elder, and M. S. Beasley. 2005. *Auditing and Assurance Services: An Integrated Approach*. Tenth edition. Upper Saddle River, NJ: Prentice Hall.
- Bame-Aldred, C. W., and T. Kida 2006. A comparison of auditor and client initial negotiation positions and tactics. *Accounting, Organizations and Society*. Forthcoming.
- Basioudis, I., and A. Steele. 2000. The alumni effect. *Accountancy* 126 (July): 132.
- BDO Seidman LLP, Crowe Chizek and Company LLC, Deloitte & Touche LLP, Ernst & Young LLP, Grant Thornton LLP, Harbinger PLC, KPMG LLP, McGladrey & Pullen LLP, and PricewaterhouseCoopers LLP. 2004. *A Framework for Evaluating Process/Transaction-Level Exceptions and Deficiencies*. Version 1. October 28, New York, NY.
- Beattie, V., S. Fearnley, and R. Brandt. 2000. Behind the audit report: A descriptive study of discussions and negotiations between auditors. *International Journal of Accounting*. 4: 177–202.
- , ———, and ———. 2004. A grounded theory model of auditor-client negotiations. *International Journal of Accounting*. 8: 1–19.
- Behn, B., J. Carcello, D. Hermanson, and R. Hermanson. 1997. The determinants of audit client satisfaction among clients of Big 6 firms. *Accounting Horizons* 11 (1): 7–24.
- . 1999. Client satisfaction and Big 6 audit fees. *Contemporary Accounting Research* 16 (4): 587–608.
- Ben-Yoav, O., and D. G. Pruitt. 1984. Resistance to yielding and the expectation of cooperative future interaction in negotiation. *Journal of Experimental Social Psychology* 34: 323–35.
- Benton, A. A., H. H. Kelley, and B. Liebling. 1972. Effects of extremity of offers and concession rate on the outcomes of bargaining. *Journal of Personality & Social Psychology* 25: 219–226.

- Braun, K. 2001. The disposition of audit-detected misstatements: An examination of risk and reward factors and aggregation effects. *Contemporary Accounting Research* 18 (1): 71–99.
- Brown, H. L., and K. Johnstone. 2005. Effects of engagement risk and auditor negotiation experience on the process and outcomes of client-auditor negotiations. Working paper, Boston College.
- Byrnes, N. 1999. Auditors and clients: Too close for comfort. *BusinessWeek* (February 22): 92.
- Chertkoff, J. M., and M. Conley. 1967. Opening offer and frequency of concession as bargaining strategies. *Journal of Personality and Social Psychology* 7: 181–185.
- , and S. L. Baird. 1971. Applicability of the big lie technique and the last clear change doctrine to bargaining. *Journal of Personality and Social Psychology* 20: 298–303.
- Cialdini, R. B., and K. Ascani. 1976. Test of a concession procedure for inducing verbal, behavioral, and further compliance with a request to give blood. *Journal of Applied Psychology* 61: 295–300.
- . 2001. *Influence*. Third edition. New York, NY: HarperCollins College Publishers.
- Eichenseher, J., and D. Shields. 1983. The correlates of CPA-firm change for publicly held corporations. *Auditing: A Journal of Practice & Theory* (Spring): 23–37.
- Fleming, P. 1996. Industry insight into the auditor change process. *Journal of Accountancy* 181 (6): 76–78.
- Gibbins, M., S. Salterio, and A. Webb. 2001. Evidence about auditor-client management negotiation concerning client's financial reporting. *Journal of Accounting Research* 39 (3): 535–563.
- , S. McCracken, and S. Salterio. 2005. Auditor-client management negotiation concerning client's financial reporting: Evidence from the client's side. Working paper, University of Alberta.
- , ———, and ———. 2006. The auditor-client relationship in financial reporting negotiation: Focusing on the dyad. Working paper, University of Alberta.
- Goodwin, J. 2002. Auditors' conflict management styles: An exploratory study. *Abacus* 38 (3): 378–405.
- Gouldner, A. W. 1960. The norm of reciprocity: A preliminary statement. *American Sociological Review* 25: 161–178.
- Graham, J. R., and C. R. Harvey. 2001. The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics* 60: 198–243.
- Hatfield, R. C., C. P. Agoglia, and M. H. Sanchez. 2006a. The effect of client characteristics on the negotiation tactics of auditors. Working paper, The University of Alabama.
- , S. B. Jackson, and S. D. Vandervelde. 2006b. The effects of audit firm versus audit partner rotation and client pressure on proposed audit adjustments. Working paper, The University of Alabama.
- Hinton, B. L., W. C. Hammer, and M. F. Polen. 1974. The influence of reward magnitude, opening bid and concession rate on profit earned in a managerial negotiation game. *Behavioral Science* 19: 197–203.
- Kelley, H. H. 1966. A classroom study of the dilemmas in interpersonal negotiations. In *Strategic Interaction and Conflict: Original Papers and Discussion*, edited by K. Archibald. Berkeley, CA: Institute of International Studies.
- , L. L. Beckman, and C. S. Fisher. 1967. Negotiating the division of reward under incomplete information. *Journal of Experimental Social Psychology* 3: 361–398.
- Komorita, S. S., and A. R. Brenner. 1968. Bargaining and concession making under bilateral monopoly. *Journal of Personality and Social Psychology* 9: 15–20.
- KPMG. 2004. Oversight of auditors: Audit committee roundtable highlights. *Audit Committee Insights* (Spring).
- Kreutzfeldt, R., and W. Wallace. 1986. Error characteristics in audit populations: Their profile and relationship to environmental factors. *Auditing: A Journal of Practice & Theory* (Fall): 20–43.
- Libby, R., and W. Kinney. 2000. Does mandated audit communication reduce opportunistic corrections to manage earnings to forecasts? *The Accounting Review* 75 (4): 383–404.

- Liebert, R., W. Smith, J. Hill, and M. Keiffer. 1968. The effects of information and magnitude of initial offer on interpersonal negotiation. *Journal of Experimental Social Psychology* 4: 431–441.
- McConnell, D. 1984. Auditor changes and related disagreements. *Auditing: A Journal of Practice & Theory* (Spring): 166–168.
- Miller, R. L., C. Seligman, N. T. Clark, and M. Bush. 1976. Perceptual contrast versus reciprocal concession as mediators of induced compliance. *Canadian Journal of Behavioral Science* 8: 401–409.
- Nelson, M. W., J. A. Elliott, and R. L. Tarpley. 2002. Evidence from auditors about managers' and auditors' earnings-management decisions. *The Accounting Review* 77 (Supplement): 175–202.
- , S. D. Smith, and Z.-V. Palmrose. 2005. The effect of quantitative materiality approach on auditors' adjustment decisions. *The Accounting Review* 80 (3): 897–920.
- Ng, T., and H. T. Tan. 2003. Effects of authoritative guidance availability and audit committee effectiveness on auditors' judgments in an auditor-client negotiation context. *The Accounting Review* 78 (July): 801–818.
- O'Connor, K. M., and P. J. Carnevale. 1992. Strategic misrepresentation in bilateral negotiation. Presented at the Fifth Annual Meeting of the International Association of Conflict Management, Minneapolis, MN.
- Pandit, G. 1999. Clients' perceptions of their incumbent auditors and their loyalty to the audit firms: An empirical study. *The Mid-Atlantic Journal of Business* 35 (4): 171–188.
- Pruitt, D., and J. L. Drews. 1969. The effect of time pressure, time elapsed, and the opponent's concession rate on behavior in negotiation. *Journal of Experimental Social Psychology* 5: 43–60.
- , and P. Carnevale. 1993. *Negotiation in Social Conflict*. Pacific Grove, CA: Books/Cole Publishing.
- Public Company Accounting Oversight Board (PCAOB). 2004. *An Audit of Internal Control over Financial Reporting Performed in Conjunction With An Audit of Financial Statements*. Audit Standard No. 2. PCAOB Release No. 2004-001, March 9. New York, NY: PCAOB.
- Putnam, L. L. 1990. Reframing integrative and distributive bargaining: A process perspective. *Research on Negotiation in Organizations* 2: 3–30.
- Raiffa, H. 1982. *The Art and Science of Negotiation*. Cambridge, MA: Belknap Press of Harvard University Press.
- Rubin, J., and B. Brown. 1975. *The Social Psychology of Bargaining and Negotiation*. New York, NY: Academic Press.
- Schindler, R. M. 1998. Consequences of perceiving oneself as responsible for obtaining a discount. *Journal of Consumer Psychology* 7: 371–392.
- Securities and Exchange Commission (SEC). 1999. *Materiality*. SEC Staff Accounting Bulletin: No. 99. SEC 17 CFR Part 211 [Release No. SAB99]. Washington, D.C.: Government Printing Office.
- Shaub, M. K. 2004. Trust as a threat to independence: Emotional trust, auditor-client interdependence, and their impact on professional skepticism. *Research on Professional Responsibility and Ethics in Accounting* 9: 169–188.
- Thompson, L. 1990. Negotiation behavior and outcomes: Empirical evidence and theoretical issues. *Psychological Bulletin* 108: 515–532.
- Trotman, K., A. Wright, and S. Wright. 2005. Auditor negotiations: An examination of the efficacy of intervention methods. *The Accounting Review* 80 (1): 349–367.
- Wang, K. J., and B. M. Tuttle. 2005. The impact of term limits on auditor-client negotiations. Working paper, University of Mississippi.
- Wright, A., and R. Ashton. 1989. Identifying audit adjustments with attention-directing procedures. *The Accounting Review* 64 (4): 710–728.
- , and S. Wright. 1997. An examination of factors affecting the decision to waive audit adjustments. *Journal of Accounting, Auditing and Finance* (Winter) 12: 15–36.

Introducing the First Management Control Systems: Evidence from the Retail Sector

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ABSTRACT: Focusing on a sample of U.S. retailers, I study the management control systems (MCS) that firms introduce when they first invest in controls, and identify four categories of initial MCS, which are defined in terms of the purposes these MCS fulfill. The first category, “Basic MCS,” is adopted to collect information for planning, setting standards, and establishing the basic operations of the firm. The other three categories are contingent on more specific purposes: “Cost MCS” focus on enhancing operating efficiencies and minimizing costs; “Revenue MCS” are introduced to foster growth and be responsive to customers; and “Risk MCS” focus on reducing risks and protecting asset integrity. I hypothesize and find that the choice among these categories reflects the firms’ strategy, and that firms that choose initial MCS better suited to their strategy perform better than others.

Keywords: *management control systems; corporate strategy; entrepreneurial organizations; firm growth.*

I. INTRODUCTION

Managerial concerns tend to change frequently in young companies in an early-stage of their growth phase (hereinafter “early-stage” firms). New functions emerge, levels in the management hierarchy multiply, jobs become more inter-related, and new coordination and communication needs arise (Greiner 1998). A growing firm confronts not only an internal transformation, but also increasing environmental complexity (Miller and Friesen 1984). As a result, managers of early-stage firms introduce formal management control systems (hereafter, MCS), which are “formal (written and standardized) information-based procedures and statements, used by managers to monitor and influence the behavior and activities in a firm” (Simons 1994, 5). Such MCS enable

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managers not only to cope with increasing information needs, but also to avoid loss of control because of lack of monitoring (Child and Mansfield 1972). However, MCS are costly and time-consuming to install and operate. As a consequence, early-stage firms are likely to choose their first set of MCS selectively.

Prior accounting research has studied MCS choices in mature firms; however, the issues underlying the choices of MCS in early-stage firms differ from those confronted by mature firms for three reasons. First, mature companies usually have an extensive amount of formal systems already in place and, thus, are less concerned about running "out of control" than early-stage firms.¹ Second, the first MCS introduced provide a foundation for the future development of MCS in the firm (Davila 2005; Davila and Foster 2005b; Nelson and Winter 1982). In this respect, while the main concern in a mature company will be how to integrate new MCS with the existing ones, a young firm must consider how the first MCS will affect the choice of future MCS. Third, early-stage firms utilize informal control systems more intensely than do mature firms (Cardinal et al. 2004; Moores and Yuen 2001) and, thus, they might decide to invest only in those formal MCS that liberate managers from routine operations and allow them to informally focus on the firm's strategy.

Notwithstanding that MCS are critical to the success, and even the survival, of early-stage firms (Merchant and Ferreira 1985), academic work in this area has been sparse and offers little guidance to practitioners. Thus, conditional on the firms' decision to start investing in MCS, this study examines managers' choices regarding the first MCS they introduce in early-stage firms (hereafter, "initial MCS").

The study is conducted in two phases using data from 40 field interviews and 97 responses to a survey directed to early-stage store-based retailers. In the first phase, based on the field study, I sought to understand what initial MCS were introduced in early-stage firms and why. I found that the initial MCS introduced in early-stage firms could be categorized usefully based on their purpose. In the second phase I use the survey data to test: (1) whether the strategy pursued by an early-stage firm significantly determines the firm's choice of particular categories of initial MCS, and (2) whether early-stage firms with a better fit between the initial MCS and their strategy experience superior performance.

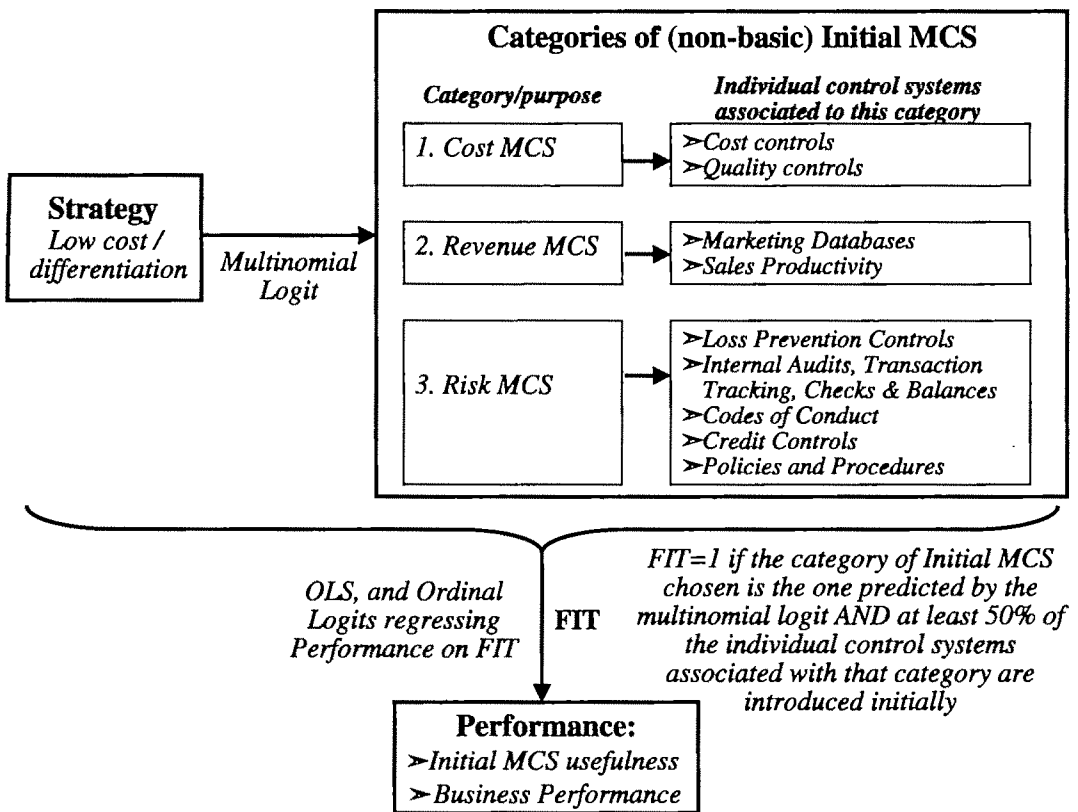
The first phase interviews reveal that entrepreneurs characterize initial MCS in terms of the *purposes* MCS should fulfill, rather than in terms of individual control systems such as budgets, inventory controls, etc., mostly because individual control systems can be used to achieve different purposes (e.g., inventory control systems could be used by some firms to learn about customers' preferences and by other firms to prevent merchandise theft) and it is the purpose that entrepreneurs really care about. Four categories of initial MCS, defined in terms of the MCS purposes, emerge from the data: Basic MCS, which constitute a "common-platform" across all firms, are used to collect information for planning and establishing the basic operations; Cost MCS are introduced to achieve operation efficiencies and cost minimization; Revenue MCS are used to achieve growth and to learn and respond to the market; and Risk MCS are used to reduce risks and protect asset integrity. It is important to highlight that individual control systems are classified into these categories based on the purpose they fulfill. For example, a marketing database used to understand and respond to customer preferences (purpose) would be classified as a Revenue MCS,

¹ An "out of control" situation is one where a firm is likely to have poor performance, despite having a reasonable strategy in place (Merchant and Van Der Stede 2003, 10). Stinchcombe (1965) argued that new organizations suffer a *liability of newness*, that is, a greater risk of failure than older organizations, because they lack structure and legitimacy. Empirical studies have supported that such risk persists even after controlling for different contingencies such as size and industry (Singh et al. 1986).

while a system of internal auditing and transaction tracking used to prevent theft (purpose) would be classified as a Risk MCS.

The second stage of the study examines whether firms adapt their initial MCS to the firm's strategy, and the performance consequences of such adaptation (see Figure 1). I predict and find that firms emphasizing differentiation strategies tend to choose as their most important initial MCS a set of Revenue MCS—as well as individual control systems such as marketing databases and sales productivity controls—rather than Cost MCS or Risk MCS.² For firms emphasizing low-cost strategies I hypothesize a more intense use of Cost MCS and Risk MCS, but find only weak evidence for this prediction. There are two possible

FIGURE 1
Conceptual Diagram: FIT between the Strategy and (non-basic) Initial MCS^a



^a Note the (non-basic) Initial MCS exclude the "Basic MCS" category. I do not test a relation between the firm's strategy and this category, since "Basic MCS" are a common platform introduced by most early-stage firms, regardless of specific purposes pursued by the firm.

² Interestingly, when I further distinguish between two types of differentiation strategies—customization and product leadership—I find that the above result only holds for customizers, while product leaders tend to place more emphasis on Cost MCS. While apparently counterintuitive, this finding is consistent with Kaplan and Norton's (2004) notion that, once product characteristics are determined, product leaders focus on controlling costs.

reasons for this: (1) Basic MCS already fulfill some of the information needs required by low-cost leaders; (2) Cost MCS and Risk MCS are implemented more broadly than Revenue MCS (i.e., most early-stage firms implement at least some Cost MCS and Risk MCS, even if their strategy is not one of “low cost”), perhaps to avoid the risk of failure that most start-ups confront, or to control routine operations that distract managers from informally focusing on strategic decisions. Finally, regarding the performance consequences of the choice of initial MCS (bottom of Figure 1), results indicate that a better fit between initial MCS and firm strategy is associated with a higher perceived usefulness of MCS and perceived business performance, as well as higher store and sales growth.

This study contributes to the management control literature in two ways. First, it complements an emerging literature related to the introduction of MCS in early-stage firms. This emerging research has focused on the time start-up companies take to adopt formal control systems as well as the determinants of such adoption. For example, Moores and Yuen (2001) show that young firms in their early growth stage increase the formality of their MCS, while Davila (2005) and Davila and Foster (2005a, 2005b) find that age, size, the presence of outside investors, a change in CEO, CEO experience, and a planning culture, are positively associated with the rate of adoption and the sequence of introduction of different categories of MCS. Second, this study contributes to the contingency research that relates strategy to MCS in mature companies (Langfield-Smith 1997), but which is usually influenced by confounding effects such as the need to integrate new MCS to the existing ones and the need to develop a strategy aligned with previously existing MCS. By analyzing the first set of MCS introduced by early-stage firms, this study provides a cleaner setting to understand the causal relationship between strategy and MCS choice.

Besides contributing to the academic literature on MCS, this study offers important insights to practitioners—entrepreneurs, investors and consultants—about the value and appropriateness of particular categories of MCS for early-stage firms. While some studies have suggested that the very implementation of MCS—by inhibiting risk taking and ability to react quickly to changes in the environment—runs contrary to the entrepreneurial spirit (Morris and Trotter 1990; Adizes 1988), managers and investors generally agree that in early-stage, high-growth firms some form of control is needed and the real question is not *whether* MCS are needed, but *which* MCS are best suited to the contingencies of each firm.

The remainder of the paper proceeds as follows: Section II develops the research questions, while Section III describes sample selection and data collection methods. Section IV focuses on the first stage of the study by developing a categorization of initial MCS. Sections V and VI develop the second stage of the study, by investigating the relationship between the choice of particular categories of initial MCS and the strategy pursued by the firm, and the performance implications associated with that choice, respectively. Section VII concludes.

II. RESEARCH QUESTIONS

A number of studies, spanning several disciplines and developed largely on the basis of experience—hereafter referred to as life-cycle studies—propose that certain categories of MCS are introduced at particular stages of firm growth and suggest that MCS introduced in early-stage firms usually focus on plans, budgets, and incentives (Flamholtz and Randle 2000; Simons 2000; Greiner 1998; Miller and Friesen 1984, 1983; Churchill and Lewis 1983). While highlighting the importance of the firm’s growth stage in the choice and use of MCS, for the most part these studies do not consider the role of contingencies within each growth stage, implicitly assuming that all firms in the same growth stage introduce the same types of MCS.

In contrast, the contingency-based research in managerial accounting shows that large, mature organizations design their MCS as a function of a number of contextual variables, including strategy, environment, technology, organizational structure, and firm size (for a summary of this literature see Chenhall 2003), resulting in differences in the type of information collected.³

Combined, these two avenues of research lead to the first research question:

Research Question 1: What types of initial MCS do early-stage firms put in place? Do initial MCS vary across early-stage firms?

Another logical question is: What are the determinants of the choice of particular types of initial MCS? Since the 1980s, the contingency literature in managerial accounting has focused on strategy as the most important driver of MCS design. Extensive research has documented an association between MCS and strategy in mature firms (see Langfield-Smith [1997] for an overview). In part, strategy has dominated other contingencies because it constitutes the means by which managers can influence all other contextual variables (external environment, technology, etc.) that were previously treated as exogenous (Chenhall 2003). Strategy also gained importance following insights from the organization theory literature suggesting that a strategy supported by the firm's organization design and control systems could be a powerful source of competitive advantage (Chandler 1962; Porter 1980; Miller and Friesen 1982). I explore the choice of the type of initial MCS by examining the following question:

Research Question 2: Are the choices of particular types of initial MCS in early-stage firms associated with the firm's strategy?

Note that the type of initial MCS introduced will not reflect the firm's strategy if early-stage firms rely heavily on informal communications to support their strategy (Lorange and Murphy 1984; Churchill and Lewis 1983), e.g., if these firms introduce their first MCS mostly to "liberate" management's time from routine matters so that management can informally focus on the strategy, or if the initial MCS are exclusively intended to reduce the risk of failure typically faced by new organizations (Singh et al. 1986; Freeman et al. 1983; Stinchcombe 1965). Under any of these scenarios, the type of initial MCS would not relate to the strategy but would instead aim at monitoring nonstrategic routine issues or collecting risk-related information.

A natural follow-up question is related to the performance implications of the choice of the type of initial MCS. In the context of mature firms, Chenhall and Langfield-Smith (1998), Simons (1987), and Govindarajan and Gupta (1985) found evidence suggesting that certain combinations of strategies and MCS lead to superior performance. In early-stage firms, the adaptation of initial MCS to the strategy may be even more relevant for future performance, since these MCS provide the foundation over which future MCS are developed (Davila 2005; Davila and Foster 2005b). This leads to the third question of this study:

³ Contingency research has found differences in MCS with respect to the content of information: (1) internal versus external (Guilting 1999; Gordon and Narayanan 1984); (2) financial versus nonfinancial (Van der Stede 2000; Ittner and Larcker 1995); (3) tight versus flexible (Chenhall and Morris 1995; Simons 1987; Merchant 1984); and (4) used for learning versus used for monitoring (Kaplan and Norton 2004; Margison 2002; Abernethy and Brownell 1999; Simons 1987); as well as with respect to attributes of information (Bowens and Abernethy 2000; Chenhall and Morris 1986): (1) aggregation, by time period, by functional area, or by formula; (2) integration, if it contributes to the coordination of subunits; (3) timeliness, if frequent or by immediate request; and (4) broad scope, if external, forward looking and nonfinancial.

Research Question 3: Are business performance and the perceived usefulness of initial MCS related to the fit between the initial MCS introduced and the firm's strategy?

I explore Research Question 1 through field interviews and Research Questions 2 and 3, by using a survey-based database to test hypotheses detailed in Sections V and VI respectively.

III. SAMPLE AND DATA COLLECTION

I develop this study using exploratory interviews with experts in entrepreneurship and retailing, as well as a survey-based database for a sample of U.S. store-based retailers. Focusing on a single industry provides depth to the study and allows me to control for several industry-specific conditions that may be relevant to the introduction of MCS in a company. Relative to other sectors, the store-based retail sector presents two major advantages, namely, more variation along the different contingencies that typically affect the choices of MCS (strategy, organizational structure), and more visible control problems associated with the growth of early-stage firms (e.g., an increase in the number of stores increases risk of theft, difficulty in understanding customer needs, problems of ineffective replenishment of inventory, lack of coordination and the need to train employees and align them to the company's strategy).⁴

I base my analysis on two main sources of information. First, I utilize information from 18 exploratory interviews that I conducted with professionals with expertise about entrepreneurial control systems and/or the retail sector. Second, I use data from a survey of top managers in 97 early-stage retail companies. The first section of the survey gathers information on each firm's strategy and asks about any major changes in strategy since the firm's inception. The second section focuses on the description of the initial MCS introduced by the firm (purpose of the initial MCS, time of introduction of different individual control systems, etc.). Other questions ask managers to self-assess the overall performance of the firm and the usefulness of MCS in the firm's development, or are designed to obtain a set of control variables.

After designing and pilot testing the questionnaire, I sent it to the CEOs of U.S.-based retailers no more than 20 years old⁵ that distributed their products through at least 20 stores or retail points. These criteria were chosen to ensure that the resulting sample was composed of young but growth-oriented firms (i.e., excluding "mom-and-pop" retailers). Through a search in Compustat, One Source, Thomson Research, and Career Search, I identified and contacted 598 firms satisfying these criteria, including 104 publicly traded firms.

⁴ A number of other reasons made the store-based retail sector an attractive candidate for this study: (1) the diversity of retailers (jewelry, electronics, restaurants, apparel, home improvement) facilitates the generalizability of results; (2) it is a sector characterized by multiple start-ups, a necessary condition to achieve a meaningful sample size for statistical analysis; (3) it is a relatively mature industry, thus it does not suffer from the lack of stability in performance that affects most of the other industries with numerous start-ups (e.g., biotech, computer software and hardware); (4) the retail sector's performance relies heavily on MCS, as opposed to other factors such as R&D discoveries; and finally; and (5) it is a significant sector of the economy, accounting for approximately 25 percent of the U.S. GDP and with an average annual growth rate of 5 percent during the last two decades.

⁵ I assumed that managers could only recall relatively recent information. Therefore, I limited the sample to firms where the founder or a veteran employee was available to answer the survey, and the firm's age was equal or less than 20 years (a company's founding date was defined as the time when the first store was opened). For the resulting sample, the time between the introduction of the initial MCS and the survey response (that is, how far the respondent had to recall) was, on average, nine years (median of eight years).

Of the 598 firms targeted, I gathered survey data from 131 (32 public and 99 private), for a response rate of 21.9 percent.⁶ In 22 cases, the survey was completed in face-to-face interviews, providing me with an opportunity to explore the reasoning behind the respondents' answers. After eliminating unsuitable responses (see Table 1, Panel A), 97 completed surveys were utilized in the analyses. In most cases, the respondent was either the president or the CEO of the firm (see Table 1, Panel B). The average (median) retailer in the sample had 130 (45) stores, and the age of the surveyed firms ranged between 2 and 20 years, averaging 13 years. Table 1, Panel C shows that 17 percent of these retailers emerged as a subsidiary or spin-off of a corporation, and 26 percent were funded by venture capitalist firms. Although most firms pursued their growth internally, 22 percent were franchisors.

In terms of industry composition, a Chi-square test shows that the sample of respondent firms is not significantly different from the target population (see Table 2, Panel A). Similarly, I find no evidence of differences in size and age between respondents and nonrespondents (see Table 2, Panel B).⁷ Thus, at least with respect to size, age, and industry composition, nonresponse bias does not appear to be a concern.

IV. FIELD STUDY ON INITIAL MCS

The first goal of this research—corresponding to Research Question 1—was to explore the types of initial MCS introduced in early-stage firms, i.e., the first set of MCS in which the firm made a significant investment.⁸ This section describes a field study that followed an iterative grounded approach, where I went back and forth between the data collected through interviews and surveys, and the emerging categories of initial MCS (Strauss and Corbin 1998). The section concludes with a summary of the findings, which suggests four categories of initial MCS.

I started off by consulting publications about retailers and conducting exploratory interviews with retail experts, to identify individual control systems used in the retail industry. I came up with a list of 20 individual control systems⁹ presented in the first column of Table 3. As I conducted my interviews, I tried to identify which of these specific control systems were most important in early-stage firms.¹⁰ However, after conducting a few interviews, it became very clear that interviewees conceived initial MCS in terms of the purposes initial MCS were meant to fulfill, not in terms of individual control systems, since (1) different individual control systems can be used to achieve the same purpose—e.g., a firm trying to learn about customer service could use marketing databases or mystery shoppers to achieve the same purpose—and (2) the same individual control system can be used to achieve different purposes—e.g., inventory control systems could be used by some firms

⁶ To maximize the rate of response, I sent one or two packets to each firm including the survey, a stamped return envelope, a pen, and an introductory letter directed to the CEO that briefly described the motivation for the study, offered a copy of the results, asked to direct the questionnaire to a qualified respondent, and guaranteed confidentiality. I followed up this mailing with two rounds of faxes and at least three telephone calls. I offered respondents a choice of completing the survey online or on paper, and public firms had the additional option of completing the survey through a telephone or face-to-face interview.

⁷ The nonresponse bias analysis presented in Table 2, yields equivalent results when the 598 target firms are compared to the 97 firms used in the final sample (instead of the 131 firms that responded the survey).

⁸ The date of the firm's first significant investment in MCS is determined based on the respondent's answer to a specific question in the survey. Focusing on the first significant investment in MCS also reduces the "low saliency" problem that often increases the memory error (Silk 1990).

⁹ Notice most of these individual control systems are used in other industries as well, although "pricing controls," "shoplifting," and "mystery shoppers" tend to be more relevant for retailing than for other industries.

¹⁰ Examples of exploratory questions I asked are: "If you were starting a new business intended to grow fast, what control systems (if any) would you put in place?" "What are the main functions that control systems should accomplish in an early-stage firm?" "What types of situations lead to the introduction of control systems in most early-stage firms?"

TABLE 1
Sample Description

Panel A: Sample Selection

Number of young retail firms targeted	598
Number of respondents (21.9 percent)	131
Less—Incomplete or invalid surveys	(17)
Less—Respondents not fitting the selection criteria:	
• Firms from other industries	(5)
• Firms older than 20 years	(8)
• Firms resulting from an acquisition	(4)
Final Sample	97

Panel B: Position of the Respondents

• President	29	(30%)
• Chief Executive Officer	24	(25%)
• President and Chief Executive Officer	21	(22%)
• General Management (VP, Chief Administrative Officer, Director)	7	(7%)
• Finance or Information Management (CFO, CIO, VP Controller, VP Information Systems)	7	(7%)
• Operations Management (COO, VP related to operations)	5	(5%)
• Others (Founder, Chairman, Owner)	4	(4%)
Total Sample	97	(100%)

Panel C: Descriptive Statistics of the Sample (n = 97)

Variable	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
SIZE (# Stores)	129.73	211.18	28	45	125
AGE (in # years)	13.27	5.18	9	15	18
PUBLIC	0.24	0.43	—	—	—
VC DUMMY	0.26	0.44	—	—	—
SUBSIDIARY	0.17	0.38	—	—	—
FRANCHISE	0.22	0.41	—	—	—

to learn about customers' preferences; by some other firms to keep track of merchandise that could otherwise be stolen; or still by other firms to learn about the efficiency of their logistics.

To learn more about the purposes pursued by entrepreneurs when they made their first investments in MCS, I continued my data collection and, after each exploratory interview, analyzed the purposes described by each individual. Different individuals described diverse purposes that I classified into three analytical categories:¹¹

- **Minimize Cost:** These initial MCS are implemented to control costs, improve the efficiency of operations, and achieve internal learning by constantly setting targets and comparing actual performance against these targets. According to the interviewees, this type of initial MCS help entrepreneurs:

¹¹ In order to achieve theoretical saturation, I completed 18 interviews. No additional purposes emerged from the last three interviews, confirming that theoretical saturation was indeed achieved.

TABLE 2
Sample Description: Nonresponse Bias

Panel A: Retail Industry Composition

<u>Retail Industry</u>	<u>Target Firms</u>		<u>Sample Firms</u>	
	<u># of Firms</u>	<u>%</u>	<u># of Firms</u>	<u>%</u>
Sporting goods stores	5	0.8	2	1.5
Building materials and hardware stores	6	1.0	2	1.5
Jewelry stores	7	1.2	2	1.5
Automotive dealers and gasoline service stations	8	1.3	3	2.3
Drug stores	9	1.5	1	0.8
Optical goods stores	11	1.8	1	0.8
Radio, TV, and Computer stores	11	1.8	3	2.3
General merchandise stores	17	2.9	3	2.3
Stationary, games, hobbies and gift stores	23	3.9	8	6.1
Home furnishings and equipment stores	32	5.4	8	6.1
Apparel and accessory stores	42	7.0	8	6.1
Food stores	65	10.9	9	6.9
Eating and drinking establishments	351	58.7	76	58.0
Other miscellaneous retail stores	11	1.8	5	3.8
Total	598	100%	131	100%

Chi-Square Test^a

Chi-Square = 10.48
Degrees of Freedom = 13
Pr > Chi-Square = 0.654

Panel B: Differences between Target and Sample Firms

<u>Variable</u>	<u>Mean for</u>		<u>Difference in Means</u>	<u>t-test (Pr > t)</u>	<u>Wilcoxon Test (Pr > z)</u>
	<u>Respondent Firms</u>	<u>Nonrespondents</u>			
SIZE (# Stores)	109.6	121.6	-12.0	0.67	0.48
AGE (in # years)	14.2	14.5	-0.3	0.53	0.38

^a The Chi-square statistic is calculated as $Q = \sum_i \frac{(f_i - e_i)^2}{e_i}$, where f_i are the observed frequencies of each industry in the sample of respondents (f_i = Respondents' Sample Size * %Responding Firms in Industry i) and e_i are the expected frequencies based on the industry composition of the target firms (e_i = Respondent's Sample Size * %Target Firms in Industry i).

- manage and understand costs (how are employees spending resources?);
- distinguish controllable from fixed costs;
- control costs once competition steps in and squeezes gross margins;
- provide information to help employees do their work efficiently and productively;
- define goals (but without imposing constraints on how to achieve those goals);
- learn how to react to contingencies;
- learn how to forecast and plan under different scenarios; and

TABLE 3
Introduction of Individual Control Systems

Individual Control Systems ^a	Proportion Introduced Initially ^b		Time to Introduce Control System (years) ^c			
	Mean	Std. Dev.	Mean	Median	n	Std. Dev.
a. Quality standards and controls	0.762	0.428	2.15	0	87	3.96
b. Policies and procedures	0.721	0.450	2.97	2	92	4.30
c. Pricing system	0.711	0.455	2.43	0	86	4.10
d. Budget controls	0.680	0.469	3.27	0	89	4.81
e. Inventory control systems to optimize stock levels and replenishment	0.649	0.479	3.63	0	88	5.33
f. Internal audits, transaction tracking, and checks and balances of information	0.649	0.479	3.60	2	92	5.02
g. Cost controls	0.649	0.479	2.48	0	80	4.13
h. Codes of business conduct	0.598	0.493	3.24	1.5	84	4.87
i. Performance-based compensation systems	0.577	0.497	3.85	2	83	5.10
j. Credit rules and controls	0.557	0.499	3.33	0	73	5.40
k. Restrictions to strategic choices (e.g., products not to be sold, customers not to be served, etc.)	0.546	0.500	2.22	2	76	3.72
l. Key performance indicators	0.536	0.501	3.78	2	88	4.84
m. Sales productivity standards (input-output measures: sales/employee, sales/square foot, etc.)	0.505	0.502	3.85	2	83	4.87
n. Loss prevention/shoplifting controls	0.495	0.502	3.21	2	77	4.69
o. Controls on employee behavior and development (turnover, training, etc.)	0.464	0.501	4.60	2	86	5.36
p. Statement of purpose/mission/credo	0.454	0.500	4.32	2	83	4.56
q. Controls for investment in long-term assets	0.453	0.500	4.52	2	80	5.10
r. Mystery shoppers	0.361	0.483	4.23	2	74	4.81
s. Externally oriented information systems, other than those related to direct customers (e.g., Market share data, data from A. C. Nielsen, Information Resources Inc, etc.)	0.309	0.464	5.00	2	64	5.27
t. Marketing databases (e.g., Customer Relationship Management systems, etc.).	0.257	0.439	5.93	3	70	5.97

Source: Survey Data

^a The 20 Individual Control Systems were classified in the questionnaire into: Strategy Related Controls (controls k, l, p, and q); Market/Customer Related Controls (controls r, s, and t); Ongoing Operations Controls (controls a, c, d, e, g, j, and m); Personnel Controls (controls i and o); and Risk Minimization Controls (controls b, f, h, and n).

^b Individual Control Systems are defined as introduced initially if they were introduced in the year (or before the year) when, according to the interviewee, the firm made its first significant investment in Control Systems.

^c Summary measures of number of years from founding date to introduction of each control system. Each line includes only the n firms (from a total of 97) that had introduced the system at the time they answered the survey.

- learn how to manage inventory and eliminate the costs of obsolescence.
- **Enhance Revenue:** The second category consists of MCS used to analyze external information, to learn and respond to customers, and to foster and support fast growth. Examples classified in this category suggest these initial MCS are used to:
 - learn about the market and competitors;
 - learn about prospective new store locations and their inventory needs;
 - implement a strategy and culture that leads to growth;
 - attract financial investors that would help the company grow;
 - direct the attention to the maximization of sales-per-square-foot;
 - build customers' confidence;
 - understand customer preferences; and
 - learn the drivers of sales (which products are selling, how effective are the ads).
- **Minimize Risk:** The last initial MCS are meant to protect asset integrity, and avoid internal risks and out of control situations (defined in footnote 1). Interviewees explained that these initial MCS are used to:
 - avoid inconsistencies in information;
 - secure and audit the systems;
 - define consistent rules and routines throughout the company;
 - avoid out-of-control situations that would harm the firm's growth and financial health;
 - control theft, by checking cash and inventory levels; and
 - (in subsidiaries) limit exposure to risks that would harm the parent company's brand.

After learning about the three main purposes of initial MCS from the exploratory interviews, and identifying 20 individual control systems used in the retail industry, I explored whether the three major purposes affected the frequency of introduction of any specific individual control systems. Thus, I incorporated two sets of questions into the survey instrument. The first set explored *which* of the 20 individual control systems were introduced in each firm, and *when*. Table 3 summarizes the survey responses. For each individual control system, the table shows: (1) the proportion of firms that adopted it initially, i.e., in the year the firm made its first significant investment in controls; (2) the average and median time from the firm's founding date (date the company opened its first store) to its introduction; and (3) the number of firms that had introduced the particular control by the time they answered the survey (n). Table 3 suggests that most of the individual control systems introduced early are internal and relate to operations, while individual control systems used to learn about customers and to scan external information are introduced later. For example, the most frequent individual control systems introduced initially include quality controls, policies and procedures, pricing controls, and budgeting. In

contrast, marketing databases and externally oriented information systems tend to be introduced at a later stage.¹²

A second set of questions in the survey asked about the *purposes* of introducing the initial set of control systems (minimize cost, enhance revenue, minimize risk). Each purpose was ranked in a Likert scale from 1 to 7, where 1 indicated that the first set of controls systems were "not used at all" and 7 indicated that they were "used to a great extent" for the purpose in question. To formally evaluate whether the choice of individual control systems relates to the three MCS purposes, I conducted the following analysis. For each of the 20 individual control systems ($j = 1, 2, \dots, 20$) identified in Table 3, I ran a logistic regression where the dependent variable was a dummy indicating whether the individual control system j was introduced among the initial set of control systems in firm i ($INITIALCS_{ji} = 1$, or 0 otherwise), and the independent variables were the Likert values for the three purposes ($COSTLIKERT_i$, $REVENUELIKERT_i$, and $RISKLIKERT_i$):¹³

$$Pr(INITIALCS_{ji} = 1) = \alpha + \beta_1 * COSTLIKERT_i + \beta_2 * REVENUELIKERT_i + \beta_3 * RISKLIKERT_i + \epsilon_i \quad (1)$$

Results in Table 4 indicate that eight of the 20 MCS are significantly related to one of the three purposes (minimize cost, enhance revenue, minimize risk). This suggests an association between those individual control systems and the corresponding initial MCS category (or purpose). The analysis also suggests the presence of three individual control systems that do not appear to be associated to any particular purpose pursued by the firm, yet were introduced by most of the sample firms among the initial set of control systems (more than 60 percent as indicated in Table 3). I describe these individual control systems as a set of "Basic MCS," which are commonly adopted because they are believed to be essential to the development of early-stage firms. These systems, which were utilized broadly, seem to be in line with some of the needs previously attributed to the purpose "Minimize Cost."

To summarize, as a result of the above analysis, I propose a categorization of initial MCS that includes two sets of systems, a set of "Basic MCS" introduced by most early-stage firms, regardless of the specific purposes emphasized by the firm, and a set of MCS chosen by early-stage firms based on specific purposes. This latter set includes "Cost

¹² To verify the robustness of the order of introduction of these individual control systems, I repeat the analysis in Table 3 by:

- (1) redefining the founding date as the incorporation date instead of the date the first store opened. The resulting order is almost equivalent to that in Table 3, with four individual control systems moving one position and only one control system changing two positions.
- (2) using a subset of firms less than ten years old ($n = 30$), on the grounds that technological changes may have affected the rate of introduction of individual control systems (by reducing costs, etc.) and that a memory bias may lead older firms to "group" together individual control systems that were actually put in place at different times. The order of introduction of the individual control systems is basically unchanged, with "budgets" being the individual control system most often introduced initially and "marketing databases" and "external controls" being the least often introduced initially. Noticeably, the average time to introduction for the 20 individual control systems decreases from 3.6 years for the full sample to 1.3 years for the less than ten year-old subsample, an indication of significant changes in the economics of the decision to adopt controls.

¹³ In untabulated tests I also include industry dummies to verify the robustness of the results.

TABLE 4
Logit Regressions Linking MCS Purposes to the Decision to Introduce Individual Control Systems Initially^a

Dependent Variable	Intercept	p-value	COST LIKERT	p-value	REVENUE LIKERT	p-value	RISK LIKERT	p-value
Dummy = 1 if control system was introduced early								
1 Cost controls	-0.22	0.38	0.21	0.08	-0.07	0.32	0.07	0.28
2 Quality standards and controls	-0.86	0.15	0.23	0.08	0.14	0.19	0.16	0.15
3 Sales productivity standards	-0.28	0.34	-0.23	0.05	0.26	0.04	0.07	0.29
4 Marketing databases	-2.41	0.00	0.09	0.28	0.24	0.07	-0.02	0.44
5 Loss prevention/shoplifting controls	-1.91	< 0.01	0.08	0.32	-0.06	0.35	0.50	< 0.01
6 Internal audits, transaction tracking, and checks and balances of information	-0.32	0.33	0.09	0.26	-0.08	0.29	0.25	0.03
7 Policies and procedures	-0.17	0.41	-0.05	0.37	0.09	0.28	0.29	0.03
8 Codes of business conduct	-1.23	0.05	0.08	0.28	0.11	0.22	0.23	0.04
9 Credit rules and controls	0.17	0.40	-0.06	0.33	-0.07	0.30	0.17	0.09
10 Budget controls	0.40	0.29	0.03	0.41	-0.01	0.47	0.07	0.29
11 Pricing system	1.01	0.10	0.06	0.34	-0.19	0.10	0.12	0.19
12 Inventory control systems	-0.86	0.12	0.14	0.16	0.07	0.37	0.17	0.10
13 Performance-based compensation systems	0.35	0.30	-0.08	0.28	0.12	0.19	-0.06	0.32
14 Controls on employee behavior and development	-1.51	0.02	0.15	0.13	0.17	0.11	-0.002	0.50
15 Controls for investment in long-term assets	0.30	0.33	-0.02	0.45	-0.07	0.30	-0.03	0.40
16 Externally oriented information systems	-0.57	0.22	-0.18	0.11	0.03	0.43	0.11	0.19
17 Restrictions to strategic choices	1.20	0.05	-0.05	0.35	-0.18	0.09	-0.004	0.49
18 Key performance indicators	0.81	0.12	0.05	0.35	-0.25	0.04	0.04	0.38
19 Statement of purpose/mission/credo	1.33	0.03	-0.14	0.16	-0.26	0.04	0.03	0.39
20 Mystery shoppers	-0.71	0.16	-0.11	0.21	0.10	0.23	0.05	0.33

^a p-values are one-tailed.

COSTLIKERT, REVENUELIKERT, RISKLKERT: Likert values describing the extent to which initial MCS are used to (1) minimize cost and achieve operation efficiencies, (2) increase revenue and adapt to the market, and (3) minimize risks, respectively, where 1 indicates "not used at all" and 7 "used to a great extent." Shaded values indicate a significantly positive relation between the early introduction of the individual control systems and COSTLIKERT, REVENUELIKERT, or RISKLKERT.

MCS,” “Revenue MCS” and/or “Risk MCS.” These categories are described as follows:¹⁴

Category of Initial MCS	Purposes fulfilled by these Initial MCS	Individual control systems associated with these Initial MCS
Basic MCS	• To set plans, standards, and support basic operations (this is a general purpose shared by almost all firms).	• Budget • Pricing System • Inventory Controls
Cost MCS	• To minimize costs, and improve operation efficiencies, using internal and financial information.	• Cost Controls • Quality Controls
Revenue MCS	• To enhance revenue, support growth, and learn about the market, using external and nonfinancial information.	• Marketing Databases • Sales Productivity
Risk MCS	• To avoid internal risks and protect asset integrity, using internal rules and procedures.	• Loss Prevention Controls • Internal Audits, Transaction Tracking, Checks and Balances • Codes of Conduct • Credit Controls • Policies and Procedures

Note that given my classification criteria, nine of the 20 individual control systems in Table 3 were not assigned to any of the four types of initial MCS, because (1) I did not find convincing evidence of a systematic relation between their frequency of introduction among the set of initial set of control systems and the early-stage firms’ purposes, and (2) even when introduced somewhat frequently, they did not seem to fit the definition of “Basic MCS” for early-stage firms.¹⁵ This should not be viewed necessarily as a limitation of the analysis, since my objective was not to classify *all* the individual control systems introduced by retailers, but to provide an intuitive framework that would capture the individual control systems *most often* introduced by early-stage firms with different purposes.

V. THE CHOICE OF INITIAL MANAGEMENT CONTROL SYSTEMS

The second research question is to determine whether a relationship exists between the strategy followed by an early-stage firm and the categories of initial MCS it chooses. This section describes the research design used and presents the corresponding analyses and results.

¹⁴ Note that I could have established the association between individual control systems and the different categories of Initial MCS using alternative classification criteria, and thus the third column of the table should be viewed as tentative. For example, if I had started defining the “Basic MCS” category before assigning the individual control systems to different purposes, quality controls would most likely have been classified as “Basic MCS” rather than “Cost MCS.”

¹⁵ For example, among the unassigned individual control systems, the one most frequently introduced initially (but less frequently than the ones categorized as Basic MCS) was “performance-based compensation systems.” I did not classify it as Basic MCS for two reasons: (1) many of the firms not introducing “performance-based compensation systems” explained that, since they were just starting to measure performance, they had no clear expectations as to set targets for compensation purposes; this is a common issue in early-stage firms and cautions against viewing such systems as “Basic”; (2) firms introducing “performance-based compensation systems” initially over time moved toward a higher percentage of performance-based compensation and lower use of subjective measures of performance, suggesting that the use of “performance-based compensation systems” was initially not heavy.

Research Design

I examine Research Question 2 by testing two hypotheses relating the categories of initial MCS to the firm's strategy, which I characterize based on the firm's strategic positioning as a cost leader and/or a differentiator (Porter 1980).¹⁶

Several studies involving mature companies have found that firms following cost leadership strategies (or similar strategies such as defender or harvest strategies) focus on cost objectives that are translated into operating goals and cost monitoring, and controls that promote efficiency and problem solving (Langfield-Smith 1997; Dent 1990; Miles and Snow 1978). Porter (1980) suggests that, in order to be successful, cost leaders should introduce cost controls and compare the cost of every activity over time and among business units and competitors (i.e., against different targets). They should also emphasize quality controls to guarantee that their products/services are comparable to those in the market (Kaplan and Norton 2004). Such characterization of MCS can be closely related to my Cost MCS category of initial MCS and the individual control systems that relate to Cost MCS (i.e., cost controls and quality controls).

Miles and Snow (1978) also indicate that firms following this strategy use MCS to reduce uncertainty and to secure conformance with planned activities, creating highly specialized jobs and standard procedures. The desire to minimize uncertainty, standardize procedures, and contain costs related to inventory shrinkage or cash shortages in a retail firm, may also lead cost leaders to introduce Risk MCS at an early stage. These studies suggest the following hypothesis:

H1: Early-stage retailers following low-cost strategies will introduce Cost MCS and Risk MCS initially more intensively than retailers not following low-cost strategies.

Firms following differentiation strategies (or similar strategies such as prospector or build strategies) use fewer formal controls and more flexible structures and processes to respond rapidly to competition and environmental change (Kaplan and Norton 2004; Guilding 1999; Porter 1980; Miles and Snow 1978). Several studies show that differentiators collect information related to customer needs and utilize subjective and nonfinancial measures to evaluate performance in an attempt to promote a long-term orientation in the firm (Langfield-Smith 1997; Simons 1987; Govindarajan and Gupta 1985; Porter 1980). These MCS characteristics can be more closely related to my Revenue MCS.¹⁷ In the context of initial MCS, the above findings suggest the following hypothesis:

H2: Early-stage retailers following differentiation strategies will introduce Revenue MCS initially more intensively than retailers not following differentiation strategies.

¹⁶ Porter (1980) describes differentiation and cost leadership as the two predominant sources of competitive advantage. "Differentiation" consists of differentiating the product or service, and thus offering to the market something that is perceived as unique. "Cost Leadership" consists of achieving overall cost leadership by excelling in operations. Cost leaders offer highly competitive prices combined with consistent quality, ease and speed of purchase, and excellent, though not comprehensive, product selection.

¹⁷ In contrast with some of the research described above, Simons (1987) finds that firms following differentiation (prospector) strategies use financial control systems more intensively than cost leaders (defenders), while Chenhall and Langfield-Smith (1998) find that differentiators receive greater benefits from quality systems than cost leaders. Both of these findings would suggest a potential relationship between differentiators and Cost MCS.

Note that I do not expect the strategy to influence the choice of Basic MCS, given that Basic MCS are a common platform introduced by most early-stage firms, regardless of specific purposes pursued by the firm.

To test H1 and H2 in a univariate setting, I compare firms following different strategies along the dimensions of cost leadership (Low Cost versus No Low Cost) and differentiation (High Differentiation versus Low Differentiation).¹⁸ For these dimensions I analyze:

- Differences between subsamples in terms of their average emphasis on the three categories of initial MCS—*COSTLIKERT*, *REVENUELIKERT*, *RISKLIKERT*—described in Section IV.
- Differences between subsamples in terms of the proportion of firms introducing initially the particular individual control systems associated with each category of initial MCS.
- In a multivariate setting, I develop the following choice model (a multinomial logit model, see Figure 1):

$$\begin{aligned} Pr(CHOICEMCS_i = MCS\_category) \\ = f(LOWCOST_i, DIFFERENTIATION_i, CONTROLS_i) \end{aligned} \quad (2)$$

CHOICEMCS is a categorical variable describing the three categories of initial MCS. This variable is coded as 1 for firms mostly emphasizing Risk MCS, 2 for Revenue MCS, and 3 for Cost MCS. Each of these emphases was rated by the survey respondents based on a Likert scale. In particular, for each firm, I define as the “most emphasized” category of initial MCS the one that received the highest Likert value. Firms with ties between two or more categories of initial MCS were excluded from the analysis, resulting in a sample size of 67 observations (with 30 firms emphasizing Cost MCS, 19 emphasizing Revenue MCS, and 18 emphasizing Risk MCS).

The main independent variables in this model consist of the strategy variables, *LOWCOST* and *DIFFERENTIATION*, constructed as composite measures from a set of survey questions that characterize the strategy of the firm. The *LOWCOST* measure reports higher values for strategies emphasizing low price, and lower values for firms and customers indifferent to prices. The *DIFFERENTIATION* measure reports higher values for strategies putting more emphasis on uniqueness, and vice versa. See the Appendix, Panel A for a definition of these measures.

The model includes a set of control variables (*CONTROLS*, defined in the Appendix, Panel A). At an organizational level, I control for the degree of *DECENTRALIZATION* of the firm, the *DIVERSITY* of its activities and whether the firm is still developing its strategy or not (dummy variable *SEARCHSTRAT*). Previous literature on mature firms (Merchant 1984, 1981; Bruns and Waterhouse 1975) indicates that more decentralized firms use formal operating control systems more heavily. Thus, I expect that decentralized firms use Risk MCS and Cost MCS more intensely to achieve tighter control over the units. Accounting theories also predict that higher diversity in products and processes induces firms to use more sophisticated cost allocation systems (Kaplan 1998; Banker et al. 1995). Thus, I expect firms with more diverse assortments to use Cost MCS more intensely. Finally, other studies

¹⁸ Unlike Porter (1980), I do not assume that these dimensions are mutually exclusive, since subsequent research has shown that these generic strategies may indeed be linked in a variety of ways (Hill 1988; Jones and Butler 1988; Murray 1988).

have indicated that MCS are utilized differently depending on whether they are used for strategy formation or for strategy implementation (Margison 2002; Ittner and Larker 2001; Simons 1990, 1994). I predict that firms in the process of developing their strategy (dummy *SEARCHSTRAT* = 1) will use Revenue MCS and Cost MCS more intensely than Risk MCS, so as to learn more about the business. In the multinomial regression, both the *LOWCOST* and *DIFFERENTIATION* strategy measures are set to zero in the cases when *SEARCHSTRAT* = 1 (13 percent of the observations). This is achieved by interacting each of the strategy variables (*LOWCOST* and *DIFFERENTIATION*) with the variable $(1 - \text{SEARCHSTRAT})$.

I also control for ownership structure—since it has been shown to affect the control structure of the firm (Baker et al. 2002; Pfeffer and Salancik 1978)—by including three dummies indicating whether the firm grew through franchising (*FRANCHISE*), whether it was a subsidiary or spin-off of another company (*SUBSIDIARY*), and whether it received financing from a venture capitalist prior to the introduction of initial MCS (*VCDUMMY*). I expect *FRANCHISE* companies to emphasize Revenue MCS and Risk MCS over Cost MCS as these types of companies focus on building the brand while relying on the incentives provided by the ownership structure to achieve cost efficiencies. Presumably, *SUBSIDIARY* firms will use Risk MCS more intensely to protect the parent company's image, whereas *VCDUMMY* firms may be more interested in Revenue MCS to increase the firm's option value for the venture capitalists holding equity in the firm.

Finally, I control for industry effects by introducing a dummy (*RESTAURANT*) indicating whether the firm is an “eating and drinking establishment” (the most represented retail subsector in my sample, see Table 1) or not. I expect *RESTAURANTS* to place more emphasis on Cost MCS and Risk MCS—given their intense focus on operations, processing of food, managing short-lived inventories, complying with FDA standards, and avoiding the risk of food theft.

Results

The univariate results shown in Table 5 provide some support for H1 in that firms pursuing a low-cost strategy place more emphasis on the use of initial MCS to Minimize Costs (see *COSTLIKERT*, $p\text{-value} = 0.059$) and, as a consequence, introduce cost controls initially more frequently ($p\text{-value} = 0.088$).¹⁹ They also place significantly less emphasis on initial MCS to enhance revenues, perhaps an indication that differentiation and low-cost strategies are not often pursued simultaneously, as suggested by Porter (1980).

The univariate tests summarized in Table 5 also provide support for H2. Firms following a differentiation strategy place significantly greater emphasis on the use of Revenue MCS and, consequently, are more likely to adopt sales productivity controls and (more weakly) marketing databases early on, consistent with their need to be responsive to the market and collect data related to customers. Firms following a differentiation strategy also tend to place less emphasis on the use of Cost MCS, consistent with Simons (1987). However, they place a special emphasis on the use of policies and procedures.

To control for other factors expected to affect the introduction of initial MCS, in a multivariate setting I analyze the multinomial logit proposed in the research design section. Because of the small sample size, Table 6, Panel A includes only the strategic determinants and the three organizational characteristics as independent variables. Panel B extends this model to include the ownership and industry variables, presenting the complete set of

¹⁹ The rate of introduction of quality controls is not different for low-cost strategy firms. However, this finding is not surprising given the widespread use of quality controls early on across all firms documented in Table 3.

TABLE 5
Univariate Tests Relating Strategy to the Introduction of Initial MCS

CATEGORIES OF INITIAL MCS Individual control systems by category	Low Cost Strategy ^b				Differentiation Strategy ^c			
	Difference in Means				Difference in Means			
	Low Cost ^d	No Low Cost ^d	Predicted Sign	p-values ^a	Differentiation Strategy ^d	No Differentiation ^d	Predicted Sign	p-values ^a
<i>COSTLIKERT</i>	4.67	4.10	+	0.57	4.12	4.65	?	-0.53
Cost Controls	0.71	0.58	+	0.13	0.64	0.65	?	-0.01
Quality Controls	0.76	0.77	+	-0.01	0.79	0.73	?	0.06
<i>REVENUELIKERT</i>	3.88	4.44	?	-0.56	4.56	3.75	+	0.81
Marketing Databases	0.20	0.31	?	-0.11	0.31	0.20	+	0.11
Sales Productivity Controls	0.49	0.52	?	-0.03	0.58	0.42	+	0.16
<i>RISKLIKERT</i>	3.79	3.43	+	0.36	3.65	3.59	?	0.06
Loss Prevention Controls	0.51	0.48	+	0.03	0.52	0.47	?	0.05
Internal Audits	0.67	0.62	+	0.05	0.69	0.61	?	0.08
Codes of Business Conduct	0.65	0.54	+	0.11	0.64	0.55	?	0.09
Credit Controls	0.55	0.56	+	-0.01	0.60	0.51	?	0.09
Policies and Procedures	0.67	0.77	+	-0.10	0.81	0.63	?	0.18
Number of observations	49	48			48	49		0.022

^a p-values present one-tailed results.

^b Strategy Measures:

The *low cost strategy* measure is a composite drawn from two survey questions, one on the firm's emphasis on low price and promotions, the other on the price sensitivity of its customers, both measured on a Likert scale.

The *differentiation strategy* is a composite drawn from three survey questions, measured by a Likert scale, on the firm's emphasis on uniqueness (in terms of products and customization).

^c Firms that place the most emphasis on the particular strategy (above sample median) are compared to those that place the least emphasis (below median).

Initial Management Control Systems:

- *COSTLIKERT*, *REVENUELIKERT*, *RISKLIKERT*: Likert values describing the extent to which initial MCS are used to (1) minimize cost and achieve operation efficiencies, (2) increase revenue and adapt to the market, and (3) minimize risks, respectively, where 1 indicates "not used at all" and 7 "used to a great extent."
- Cost Controls, Quality Controls, Marketing Databases, Sales Productivity Controls, Loss Prevention Controls, Internal Audits, Codes of Business Conduct, Credit Controls and Policies and Procedures: Dummy variables indicating if each control system was introduced initially (1) or not (0). Results present the % firms introducing each individual control system.

TABLE 6
Multinomial Logit: Strategic Choice of Initial Management Control Systems

	Comparison of Emphases of MCS					
	<i>REVENUEMCS/ RISKMCS</i>		<i>COSTMCS/ RISKMCS</i>		<i>REVENUEMCS/ COSTMCS</i>	
	Coefficient	Pr > ChiSq	Coefficient	Pr > ChiSq	Coefficient	Pr > ChiSq
Panel A: Strategic and Organization Determinants of Initial MCS						
(n = 61, Count R ² = 0.56, AdjCount R ² = 0.21)						
Intercept	-0.120	0.772	0.385	0.292	-0.505	0.189
<i>LOWCOST*</i> (1 - <i>SEARCHSTRAT</i>)	-0.074	0.722	-0.163	0.409	0.089	0.636
<i>DIFFERENTIATION*</i> (1 - <i>SEARCHSTRAT</i>)	0.109	0.546	-0.220	0.169	0.328	0.041
<i>DECENTRALIZATION</i>	-0.320	0.072	-0.191	0.241	-0.129	0.399
<i>DIVERSITY</i>	-0.107	0.092	-0.030	0.483	-0.077	0.210
<i>SEARCHSTRAT</i>	0.852	0.419	0.451	0.642	0.401	0.652
Panel B: Add Ownership Controls and Industry						
(n = 61, Count R ² = 0.66, AdjCount R ² = 0.38)						
Intercept	0.740	0.409	0.921	0.287	-0.180	0.796
<i>LOWCOST*</i> (1 - <i>SEARCHSTRAT</i>)	-0.071	0.744	-0.205	0.316	0.135	0.493
<i>DIFFERENTIATION*</i> (1 - <i>SEARCHSTRAT</i>)	0.099	0.612	-0.217	0.212	0.316	0.068
<i>DECENTRALIZATION</i>	-0.232	0.297	-0.197	0.321	-0.035	0.851
<i>DIVERSITY</i>	-0.158	0.096	-0.034	0.586	-0.124	0.160
<i>SEARCHSTRAT</i>	1.033	0.356	0.754	0.463	-0.279	0.770
<i>FRANCHISE</i>	0.399	0.679	-0.686	0.489	1.085	0.243
<i>VCDUMMY</i>	-0.198	0.860	-0.844	0.398	0.646	0.512
<i>SUBSIDIARY</i>	-0.516	0.641	-0.744	0.421	0.228	0.831
<i>RESTAURANT</i>	-1.359	0.276	-0.199	0.863	-1.159	0.256

Source: Survey Data

Dependent Variable:

It was constructed utilizing the categorical variable *CHOICEMCS*, which indicates what initial MCS does the firm emphasize: Risk MCS, Revenue MCS, or Cost MCS. For details, see Section V.

Strategy Variables (see details in Section V):

LOWCOST = composite measure that proxies for the firm's emphasis on cost leadership. It takes higher values for firms emphasizing low costs strategies; and

DIFFERENTIATION = composite measure indicating the extent to which a firm pursues a differentiation strategy.

Control Variables (see details in Appendix, Panel A):

DECENTRALIZATION = composite measure from two variables, describing the extent of decentralization in the firm;

DIVERSITY = proxy for heterogeneity of activities, measuring the diversity of the assortment offered by the retailer;

FRANCHISE = dummy indicating whether a firm grew mostly through franchising (1) or not (0);

SEARCHSTRAT = dummy indicating whether the firm defined its strategy after introducing its MCS (1) or not (0);

SUBSIDIARY = dummy equal to 1 if the firm is/was a subsidiary or spin-off from a larger company, and 0 otherwise;

VCDUMMY = dummy on whether the firm received VC funding (1) or not (0) before the introduction of initial MCS; and

RESTAURANT = dummy equal to 1 if the retail firm is an eating and/or drinking establishment, 0 otherwise.

hypothesized determinants of the choice of initial MCS. Consistent with H2, results show that firms following a differentiation strategy tend to place more emphasis on Revenue MCS than on Cost MCS (right column of Table 6).²⁰ This result is robust across the two panels and is consistent with the univariate tests in Table 5. The multinomial test, however, does not provide support for H1: low-cost strategies do not appear associated with a more intense use of Cost MCS. This may occur either because Basic MCS already incorporate controls that support a low-cost strategy, or because Cost MCS and Risk MCS are implemented to some extent by most early-stage firms—even if their strategy is not one of “low cost”—perhaps to avoid the risk of failure, or to control routine operations that distract managers from informally focusing on strategic decisions. Table 6 also shows that a higher degree of decentralization and product diversity is associated with more emphasis on Risk MCS relative to Revenue MCS. The former result is consistent with a number of studies that have documented a greater use of tight (less subject to discretion) control systems in decentralized organizations (Bruns and Waterhouse 1975; Child 1972). As for product diversity, a potential explanation is that early-stage firms that grow rapidly by offering a diverse assortment of products need to invest in Risk MCS to avoid running out of control. The multinomial model predicts correctly the choice of initial MCS in 66 percent of the cases. A more refined measure of fit is the adjusted count R^2 (Long 1997), which is equal to 38 percent and can be interpreted as the extent to which the multinomial model reduces errors in prediction relative to a model that predicts that all firms will emphasize the most frequent type of initial MCS.²¹

Additional Results on Differentiation Strategies

To provide further insights into H2, I analyze two types of differentiation strategies, one based on Customization and one based on Product Leadership.²² Univariate and multivariate analyses (untabulated) show that, consistent with the results for differentiators in general, both firms following product leadership and firms focused on customization place stronger emphasis on the use of Revenue MCS. However, this emphasis translates into a higher rate of adoption of two different revenue-related individual control systems: marketing databases for products leaders, and sales productivity controls for customization firms. Two other interesting aspects that distinguish customizers from product leaders are:

²⁰ Results are presented in three columns (expressed in the form A/B) where the coefficients represent the log-odds of outcome “A” versus outcome “B”: $\ln \left[\frac{\Pr(\text{CHOICEMCS} = \text{“A”})}{\Pr(\text{CHOICEMCS} = \text{“B”})} \right]$. For example, the next to last column expresses the log-odds that a firm chooses *REVENUE MCS* versus *COST MCS*. In Panel A, results indicate that for a unit change in the “differentiation strategy” measure, the log-odd ratio of *REVENUE MCS* versus *COST MCS* is expected to increase by 1.39 times, where $1.39 = \exp(0.328)$.

²¹ I verify the robustness of the results in the multinomial logit model in two ways: (1) I use the Hausman and McFadden (1984) test to verify the Independence of Irrelevant Alternatives (IIA) assumption implicit in the multinomial logit and find that the assumption cannot be rejected; (2) I conduct three logit regressions where the dependent variable reflects the relative emphasis on two categories of initial MCS (e.g., Revenue MCS and Risk MCS) while the emphasis on the third category (e.g., Cost MCS) is explicitly controlled for as an additional independent variable. The results (untabulated) are generally consistent with the findings in the multinomial model. Firms following differentiation strategies emphasize Revenue MCS over Risk MCS and Risk MCS over Cost MCS, while firms with a more diverse assortment of products and a more decentralized structure put more emphasis on Risk MCS than Revenue MCS.

²² Customization strategies are focused on building long-lasting relationships with the customers, requiring that the firm develop excellent service capabilities and employees’ responsiveness to targeted customers. Product leadership strategies consist of offering unique products that customers are willing to pay a premium for. “Product leaders” must develop systems to discover new opportunities for superior products and services but should also reduce costs once product characteristics have been stabilized (Kaplan and Norton 2004; Treacy and Wiersema 1995).

first, customizers place more emphasis on Risk MCS than Cost MCS, possibly because of the importance that the customizers give to “policies and procedures” aimed at maintaining a long-term relationship with customers; and second, while firms focused on customization (similar to differentiators in general) place much less emphasis on the use of Cost MCS, product leaders tend to place more emphasis on such use, and as a consequence, are significantly more likely to introduce quality controls and cost controls. This apparently puzzling result is consistent with Kaplan and Norton’s (2004) observation that firms differentiating through product leadership need to control costs once product characteristics are defined. In the case of retailers, this might reflect the product leaders’ focus on negotiating favorable terms with suppliers.

VI. PERFORMANCE IMPLICATIONS OF THE CHOICE OF INITIAL MANAGEMENT CONTROL SYSTEMS

The multinomial logit analysis yields a model of fit between the category of initial MCS chosen (emphasized) by a firm and its strategy and organizational characteristics. In this section, I assume that such model captures, on average, optimal behavior, and I use deviations from the model’s predictions to answer Research Question 3—i.e., whether business performance and the perceived usefulness of initial MCS relates to the fit between initial MCS and firm’s strategy. Specifically, I test the following hypothesis:

H3: Early-stage firms with a better fit between their initial MCS and their strategy experience (a) superior business performance and (b) a higher perceived usefulness of initial MCS.

Research Design

To test H3, I classify the sample firms in two groups based on whether their choice of a category of initial MCS deviates from the “optimal” choice predicted by the multinomial logit model. For each firm, I identify the category of initial MCS with the highest probability of being selected according to the multinomial logit and define a dummy variable, *FIT*, equal to 1 if the firm actually chose (i.e., placed most emphasis on) that predicted category of initial MCS and introduced at least 50 percent of the individual control systems related to that category, and 0 otherwise. As a result, firms are classified into: “High-Fit” (*FIT* = 1), and “Low-Fit” (*FIT* = 0). I then compare these two groups in terms of the usefulness of initial MCS and three measures of business performance:

- *USEFULMCS*: This is a categorical variable based on a survey question where managers were asked to assess from 1 to 7 the overall usefulness of their firms’ initial MCS (with 7 being most useful).
- *PERCPERFORM*: This is a categorical variable drawn from a survey question where managers were asked to evaluate the firm’s overall performance since founding, relative to the retail industry. The scale of this variable is described as 1 if the firm’s performance is in the bottom 10 percent, 2 if it is in the bottom 25 percent, 3 if it is average, 4 if it is in the top 25 percent and 5 if it is in the top 10 percent.
- *SALESGROWTH* and *STOREGROWTH*: These variables are the geometric average of the annual growth in sales and number of stores, respectively, since the year of introduction of initial MCS (or the first subsequent year with available data).²³

²³ Notice that I measured performance *after* the introduction of Initial MCS to mitigate concerns with endogeneity. These data were obtained from Compustat, Lexis-Nexis, and a follow-up telephone call to the respondents (to obtain number of stores).

The first two measures are based on the respondents' assessment and thus represent measures of *perceived* usefulness of initial MCS and business performance, respectively. The other two variables represent instead measures of *actual* business performance.

To perform the multivariate test, I run two Ordinal Logit Models where the dependent variables are the measures of perceived usefulness of initial MCS and perceived performance described above—*USEFULMCS* and *PERCPERFORM*—and two Ordinary Least Squares Models where the dependent variables are the two measures of actual performance (see Figure 1). In these regressions, the independent variables include the dummy variable *FIT* and a number of control variables:

$$USEFULMCS_i \text{ or } PERFORMANCE_i = f(FIT_i, CONTROL\ VARIABLES_i). \quad (3)$$

I include a set of control variables from the literature (see the Appendix, Panel B for detailed definitions), which are correlated both with the introduction of MCS and the performance of an early-stage firm. These variables include *CEOCHANGE*, *VCDUMMY*, *EXPERIENCE*, *SIZE*, and *AGE*. Previous literature has found that the change of CEO and the presence of VC funding are positively associated with improved performance and increased probability of effectively introducing initial MCS (Davila 2005; Certo et al. 2001; Hellman and Puri 2002; Willard et al. 1992; Singh et al. 1986). Similarly, I predict that the presence of a CFO/top manager with previous experience introducing MCS in a growing firm will increase the chances of introducing effective MCS and, thus, enhance performance (Bruderl et al. 1992). Size and age have also been associated with performance as well as with the emergence of MCS in companies. With respect to performance, older firms are more likely to survive—i.e., achieve higher performance—than younger firms (Hannan and Freeman 1989; Singh et al. 1986; Freeman et al. 1983), and smaller firms have been documented to experience lower operating performance than larger firms (Fama and French 1995), presumably because small companies tend to be riskier and large firms can improve performance through economies of scale.²⁴ With respect to the use of MCS, literature in accounting has found a more intensive use of MCS in larger and older firms (Davila 2005; Davila and Foster 2005a, 2005b; Merchant 1981; Khandwalla 1977; Bruns and Waterhouse 1975), suggesting a right *FIT* of initial MCS may be most useful and more likely to enhance performance in such firms. On the other hand, *USEFULMCS* might be negatively associated with age, given that technologies have become more available and less expensive in recent years, increasing the potential benefits younger firms can derive from initial MCS.

Results

Univariate results in Table 7, Panel A show that firms with a better fit based on the multinomial logit and the associated individual control systems (High-Fit) appear to perform better than the other firms (Low-Fit), in terms of both perceived and actual performance, consistent with H3. For the variables *PERCPERFORM*, *USEFULMCS*, and *SALES-GROWTH*, the difference in mean performance across the two subsamples is statistically significant. For *STOREGROWTH*, though insignificant, the difference is in the predicted direction.

²⁴ Note that since my measure of size is based on current data, a positive association with performance can partly reflect a survivorship bias (Brown et al. 1997) or simply that top performers grew bigger.

TABLE 7
Performance Tests

Panel A: Univariate Results^a

Performance Variable	Mean for Subsample		Difference in Means	t-test (Pr > t)	Wilcoxon Test (Pr > z)
	High-Fit <i>FIT</i> = 1	Low-Fit <i>FIT</i> = 0			
<i>PERCPERFORM</i>	3.94	3.50	0.45	0.038	0.064
<i>USEFULMCS</i>	5.78	4.33	1.45	0.001	0.001
<i>SALESGROWTH</i>	0.47	0.24	0.23	0.059	0.032
<i>STORESGROWTH</i>	0.28	0.22	0.06	0.174	0.121

Panel B: Multivariate Results

$$Performance = f(FIT, CEOCHANGE, EXPERIENCE, VCDUMMY, SIZE, AGE)$$

	Performance Measure			
	Ordinal Logits ^b		OLS Regressions	
	<i>PERCPERFORM</i>	<i>USEFULMCS</i>	<i>SALES GROWTH</i>	<i>STORE GROWTH</i>
Constant			0.635	0.144
p-value			0.031	0.204
<i>FIT</i>	1.288	2.209	0.321	0.158
p-value	0.032	<0.001	0.020	0.016
<i>CEOCHANGE</i>	-2.468	-0.039	-0.120	-0.014
p-value	<0.001	0.947	0.480	0.842
<i>EXPERIENCE</i>	0.339	0.552	-0.055	0.128
p-value	0.592	0.373	0.746	0.068
<i>VCDUMMY</i>	0.688	0.169	-0.025	0.076
p-value	0.346	0.813	0.860	0.314
<i>SIZE</i>	0.004	0.003	0.0002	0.0001
p-value	0.019	0.044	0.347	0.342
<i>AGE</i>	0.081	-0.100	-0.031	-0.009
p-value	0.156	0.077	0.058	0.173
R ² (n)	0.156 ^c (55)	0.111 ^c (55)	0.297 (22)	0.161 (42)
Prob > χ^2:				
Likelihood ratio test of proportionality of odds	0.494	< 0.001		

^a p-values in the univariate analysis describe one-tailed tests.

^b Cutoff points predicted for the ordinal logit are untabulated.

^c Pseudo-R²s are reported for ordinal logit results.

PERCPERFORM = a categorical variable drawn from a question in the survey, measuring managers' perception of firm's performance since founding, in a scale where 1 indicates bottom performance and 5 top;

USEFULMCS = a categorical variable from the survey where managers were asked to assess from 1 to 7 the overall contribution of initial MCS to the development of their firms (with 7 being most useful);

SALESGROWTH, STOREGROWTH = the geometric average of the annual growth of sales and number of stores respectively, starting on the year MCS were first introduced in the firm (using all data available);

(continued on next page)

TABLE 7 (Continued)

<i>FIT</i>	= a dummy equal to 1 if the firm implemented the MCS predicted as the most probable by the multinomial logit model, and 0 otherwise;
<i>CEOCHANGE</i>	= a dummy variable that indicates whether the founder was replaced by a CEO (1) or not (0);
<i>EXPERIENCE</i>	= a dummy indicating if CFO had experience introducing MCS in growing firms (1) or not (0);
<i>VCDUMMY</i>	= a dummy indicating whether firm received VC funding (1) or not (0);
<i>SIZE</i>	= the number of stores in the firm; and
<i>AGE</i>	= the number of years since the date of founding.

Multivariate results in Table 7, Panel B, show a significant positive association between *FIT* and all the performance measures, providing further support for H3.²⁵ As for the control variables, as predicted *SIZE* and *EXPERIENCE* are positively related to the measures of initial MCS usefulness and business performance, although the relation is statistically significant only in some cases. *AGE* is negatively related to *USEFULMCS* and *SALES-GROWTH*, perhaps since *AGE* captures improvements in technology that may have resulted in more useful initial MCS, as well as higher growth possibilities in younger retail firms. Somewhat surprisingly, *CEOCHANGE* is negatively related to most performance variables, although significantly so only when *PERCPERFORM* is the dependent variable.

To verify the robustness of the univariate and multivariate results, I also redefined the variable *FIT* in two ways: (1) *FITabove40*, a dummy equal to 1 if the firm emphasizes a category of initial MCS with a predicted probability of being selected above 40 percent (based on the multinomial logit model) and introduced at least 50 percent of the individual control systems associated to that category, and 0 otherwise; and (2) *FITdegree*, a continuous variable measuring the probability that the firm emphasized the observed category of initial MCS, based on the multinomial model. The key findings remain unchanged (untabulated results).

Note that the performance effect presented above cannot be exclusively attributed to the fit between the initial MCS and the strategy, since the multinomial model is also based on other organizational variables separate from the strategy. I conduct two additional analyses to better understand whether the fit between initial MCS and strategy plays a role on performance: (1) I replicate the results in Table 7, Panel B for the subsample of firms with a differentiation score above median, given that differentiation was the only strategy variable that was a significant predictor in the multinomial model; (2) I replicate the results in Table 7, Panel B using a re-defined *FIT* variable, where the multinomial model is substituted for one that only includes the strategy variables as explanatory variables. The *FIT* variable is positively related to the usefulness of initial MCS and all business performance measures in both tests (1) and (2). However the result becomes insignificant when the dependent variable is *STOREGROWTH* in test (1), and when the dependent variables are *PERCPERFORM* and *SALESGROWTH* in test (2).

VII. CONCLUSIONS

This study provides insights about the choices made by entrepreneurs when deciding what type of initial MCS to introduce, and the determinants and consequences of such

²⁵ In the bottom row of Table 7, Panel B, I test the proportional odds assumption implicit in the Ordinal Logit model. The assumption is not rejected for the test using *PERCPERFORM* as the dependent variable. However, the assumption is rejected at the 1 percent level when *USEFULMCS* is the dependent variable. To verify the robustness of the *USEFULMCS* results, I additionally run an OLS regression and find similar results (i.e., *FIT* remains positively and significantly related to *USEFULMCS* at the 1 percent level).

choices. Looking at a sample of store-based retailers, I find that early-stage firms tend to introduce four categories of initial MCS based on the purposes pursued: Basic MCS, which are similar across all firms, are used to collect information for planning and establishing basic operations; Cost MCS, which are introduced to achieve operation efficiencies and cost minimization; Revenue MCS, which are used to achieve growth and learn about—and be responsive to—the market; and Risk MCS, which are used to reduce risks and protect asset integrity.

I hypothesize and find that the choice among these categories of initial MCS depends on the firm's strategy and structure, and that firms that choose initial MCS better suited to their strategy perform better than other firms. The findings, however, should be interpreted with caution. First, the focus on a single industry—the retail sector—rather than multiple industries may limit the ability of generalizing the results, particularly with respect to manufacturing companies where technological considerations may affect the choice of the types of initial MCS (see Chenhall [2003, section 5.2] for a summary on technology contingencies). Second, ideally this study should have used “real-time” data, rather than relying on the recollections of survey respondents, and should have employed triangulation (i.e., more than one respondent per firm) to minimize memory and interpretation biases. In practice, such an approach would have been prohibitively costly and time consuming. Third, the weak results relating the low-cost strategy with the use of Cost MCS and Risk MCS should not be taken as conclusive, since this finding may be reflecting lack of power due to the small sample size. Finally, the study also presents potential survival and self-selection biases. I partially mitigated the survival bias by including firms ranging from 2 to 20 years old, the self-selection problem by increasing efforts to maximize the rate of response.

Notwithstanding these limitations, the results presented in this study contribute to an emerging literature in the accounting, control, and entrepreneurship fields concerned with the development of MCS in early-stage businesses. By establishing the importance of contingencies in the choice of different types of initial MCS in early-stage firms and by providing evidence on the performance implications of that choice, this study calls for more work to deepen our understanding of the trade-offs faced by early-stage firms when implementing MCS.

APPENDIX

Variables for Models of Choice and Performance

Panel A: $CHOICEMCS_i = f(LOWCOST_i, DIFFERENTIATION_i, CONTROLS_i)$

	Expected Relation to Dependent Variable
<i>LOWCOST</i> is a principal components measure that captures 81 percent of the variation in two questions: (1) the extent to which the firm's customers search for lower prices and, (2) the emphasis the firm places on lower prices and promotions as a way to attract and retain customers. The corresponding Cronbach's alpha is 0.77. ^a	Emphasis on: Cost and Risk MCS

DIFFERENTIATION is a principal components measure that captures 65 percent of the variation in three questions: (1) the customer's demand for uniqueness, (2) the extent to which the firm offers unique products highly valued by target customers, and (3) the extent to which the firm emphasizes service and customization to the customers. The Cronbach's alpha in this case is 0.70.^a

Emphasis on:
Revenue MCS

DECENTRALIZATION is a composite measure developed through principal components analysis of items describing the extent of decentralization in the firm. It explains 78 percent of the variation found in two questions in the survey that ask about the extent to which store managers have authority to make decisions about: (1) hiring and firing personnel, (2) signing invoices. Cronbach's alpha is 0.56. Higher values indicate higher levels of decentralization (decision making by managers rather than head office).

Emphasis on: Cost
and Risk MCS

DIVERSITY is a measure of the heterogeneity of activities in the firm. It is a composite measure developed through principal components analysis that captures 86 percent of the variation of four questions (three Likert-based questions on the firm's strategic emphasis on the diversity and the relative breadth and depth of the assortment, and one question indicating the number of SKUs offered by the retail company). The Cronbach's alpha is 0.70.

Emphasis on: Cost
MCS

FRANCHISE is a dummy indicating whether a firm grew mostly through franchising or not.

Emphasis on: Risk
and Revenue MCS

SUBSIDIARY is a dummy indicating whether the retail firm is/was a subsidiary or spin-off from a larger company (general information, first section of the survey).

Emphasis on: Risk
MCS

VCDUMMY is a dummy indicating whether the firm received VC funding or not before the introduction of initial MCS.

Emphasis on:
Revenue MCS

RESTAURANT is a dummy indicating whether the firm is an eating and/or drinking establishment (SIC 5812) or not (obtained from One Source and Career Search).

Emphasis on: Risk
and Cost MCS

SEARCHSTRAT is a dummy indicating whether the firm defined its strategy after introducing its MCS (1) or not (0).

Emphasis on: Cost
and Revenue MCS

Panel B: $PERFORMANCE_i = f(FIT_i, CONTROL\ VARIABLES_i)$

CEOCHANGE is a dummy indicating whether or not the founder was replaced by a CEO before the introduction of initial MCS.

Positive

EXPERIENCE is a dummy indicating whether the person introducing the initial MCS (e.g., CFO) had previous experience introducing controls in growing firms.

Positive

AGE is the number of years since the date of founding.

Positive

SIZE is the number of stores in the firm.

Positive

VCDUMMY is a dummy indicating whether the firm received Positive
VC funding or not before the introduction of initial MCS.

* Chenhall and Langfield-Smith (1998) use similar questions to identify cost leadership and differentiation strategies.

REFERENCES

- Abernethy, M. A., and P. Brownell. 1999. The role of budgets in organizations facing strategic change: An exploratory study. *Accounting, Organizations and Society* 24 (3): 189–204.
- Adizes, I. 1988. *Corporate Lifecycles*. Englewood Cliffs, NJ: Prentice Hall.
- Baker, G., R. Gibbons, and K. Murphy. 2002. Relational contracts and the theory of the firm. *The Quarterly Journal of Economics* 117 (1): 39–84.
- Banker, R., Potter, G., and R. Schroeder. 1995. An empirical analysis of manufacturing overhead cost drivers. *Journal of Accounting and Economics* 19 (1): 115–137.
- Bowens, J., and M. A. Abernethy. 2000. The consequences of customization on management accounting system design. *Accounting, Organizations and Society* 25 (3): 221–241.
- Brown, S., W. Goetzmann, R. Ibbotson, and S. Ross. 1997. Rejoinder: The J-shape of performance persistence given survivorship bias. *The Review of Economics and Statistics* 79 (2): 167–170.
- Bruderl, J., P. Preisendorfer, and R. Ziegler. 1992. Survival chances of newly founded business organizations. *American Sociological Review* 57 (2): 227–242.
- Bruns, Jr., W. J., and J. H. Waterhouse. 1975. Budgetary control and organizational structure. *Journal of Accounting Research* 13 (2): 177–203.
- Cardinal, L. B., S. Sitkin, and C. Long. 2004. Balancing and rebalancing in the creation and evolution of organizational control. *Organization Science* 15 (4): 411–431.
- Certo, S. T., J. G. Covin, C. M. Daily, and D. R. Dalton. 2001. Wealth and the effects of founder management among IPO-stage new ventures. *Strategic Management Journal* 22 (6–7): 641–658.
- Chandler, A. D. 1962. *Strategy and Structure*. New York, NY: Doubleday.
- Chenhall, R. H., and D. Morris. 1986. The impact of structure, environment and interdependencies on perceived usefulness of management accounting systems. *The Accounting Review* 61 (1): 16–35.
- , and ———. 1995. Organic decision and communication processes and management accounting systems in entrepreneurial and conservative business organizations. *Omega, International Journal of Management Science* 23 (5): 485–497.
- , and K. Langfield-Smith. 1998. The relationship between strategic priorities, management techniques and management accounting: An empirical investigation using a systems approach. *Accounting, Organizations and Society* 23 (3): 243–264.
- . 2003. Management control systems design within its organizational context: Findings from contingency-based research and directions for future research. *Accounting, Organizations and Society* 28 (2–3): 127–168.
- Child, J. 1972. Organization structure and strategies of control: A replication of the Aston study. *Administrative Science Quarterly* 17 (2): 163–177.
- , and R. Mansfield. 1972. Technology, size and organizational structure. *Sociology* 6: 369–393.
- Churchill, N. C., and V. L. Lewis. 1983. The five stages of small business growth. *Harvard Business Review* 61 (May–June): 30–50.
- Davila, T. 2005. An exploratory study on the emergence of management control systems: Formalizing human resources in small growing firms. *Accounting, Organizations and Society* 30 (3): 223–248.

- , and G. Foster. 2005a. Management accounting systems adoption decisions: Evidence and performance implications from startup companies. *The Accounting Review* 80 (4): 1039–1068.
- , and ———. 2005b. Early-stage startup companies: The role of management accounting in the evolving portfolio of management control systems. Working paper, Stanford University.
- Dent, J. F. 1990. Strategy, organization and control: Some possibilities for accounting research. *Accounting, Organizations and Society* 15 (1–2): 3–25.
- Fama, E., and K. French. 1995. Size and book to market factors in earnings and returns. *Journal of Finance* 50 (1): 131–155.
- Flamholtz, E., and Y. Randle. 2000. *Growing Pains*. San Francisco, CA: Jossey-Bass.
- Freeman, J., G. R. Carroll, G. R. and M. T. Hannan. 1983. The liability of newness: Age dependence in organizational death rates. *American Sociological Review* 48 (5): 692–710.
- Gordon, L., and V. K. Narayanan. 1984. Management accounting systems, perceived environmental uncertainty and organization structure: An empirical investigation. *Accounting, Organizations and Society* 9 (1): 33–47.
- Govindarajan, V., and A. K. Gupta. 1985. Linking control systems to business unit strategy: Impact on performance. *Accounting, Organizations and Society* 10 (1): 51–66.
- Greiner, L. E. 1998. Evolution and revolution as organizations grow. Reprint of a 1972 article. *Harvard Business Review* 76 (3): 55–67.
- Guilting, C. 1999. Competitor-focused accounting: An exploratory note. *Accounting, Organizations and Society* 24 (7): 583–595.
- Hannan, M., and J. Freeman. 1989. *Organizational Ecology*. Cambridge, MA: Harvard University Press.
- Hausman, J., and D. McFadden. 1984. A specification test for the multinomial logit model. *Econometrica* 52 (4): 909–938.
- Hellman, T., and M. Puri. 2002. Venture capital and the professionalization of start-up firms: Empirical evidence. *Journal of Finance* 57 (1): 169–198.
- Hill, C. W. 1988. Differentiation versus low cost or differentiation and low cost: A contingency framework. *The Academy of Management Review* 13 (3): 401–412.
- Ittner, C., and D. Larcker. 1995. Total quality management and the choice of information and reward systems. *Journal of Accounting Research* 33 (1): 1–34.
- , and ———. 2001. Assessing empirical research in managerial accounting: A value based management perspective. *Journal of Accounting and Economics* 32 (1–3): 349–410.
- Jones, G. R., and J. E. Butler, 1988. Cost, revenue, and business-level strategy. *The Academy of Management Review* 13 (2): 202–213.
- Kaplan, R. 1998. Introduction to activity based costing. Technical Note. Boston, MA: Harvard Business School Press.
- , and D. Norton. 2004. *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*. Boston, MA: Harvard Business School Press.
- Khandwalla, P. 1977. *The Design of Organizations*. New York, NY: Harcourt Brace Jovanovich.
- Langfield-Smith, K. 1997. Management control systems and strategy: A critical review. *Accounting, Organizations and Society* 22 (2): 207–232.
- Long, J. S. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage Publications.
- Lorange, P., and D. Murphy. 1984. Considerations in implementing strategic control. *Journal of Business Strategy* 5: 27–35.
- Margison, D. E. 2002. Management control systems and their effects on strategy formation at middle-management levels: Evidence from a U.K. organization. *Strategic Management Journal* 23 (11): 1019–1031.
- Merchant, K. A. 1981. The design of the corporate budgeting system: Influences on managerial behavior and performance. *The Accounting Review* 56 (4): 813–829.
- . 1984. Influences on departmental budgeting: An empirical examination of a contingency model. *Accounting, Organizations and Society* 9 (4): 291–307.

- , and L. Ferreira. 1985. Performance measurement and control issues in small businesses. In *The Accounting Profession and the Middle Market*, edited by B. E. Needles, Jr., 81–103. Chicago, IL: DePaul University.
- , and W. Van Der Stede. 2003. *Management Control Systems: Performance Measurement, Evaluation and Incentives*. London, U.K.: Pearson/Prentice Hall.
- Miles, R. W., and C. C. Snow. 1978. *Organizational Strategy, Structure and Process*. New York, NY: McGraw Hill.
- Miller, D., and P. H. Friesen. 1982. Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal* 3 (1): 1–25.
- , and ———. 1983. Successful and unsuccessful phases of the corporate life cycle. *Organization Studies* 4 (4): 339–356.
- , and ———. 1984. A longitudinal study of the corporate life cycle. *Management Science* 30 (10): 1161–1183.
- Moore, K., and S. Yuen. 2001. Management accounting systems and organizational configuration: A life cycle perspective. *Accounting, Organizations and Society* 26 (4–5): 351–389.
- Morris, M. H., and J. D. Trotter. 1990. Institutionalizing entrepreneurship in a large company: A case study at AT&T. *Industrial Marketing Management* 19 (2): 131–139.
- Murray, A. I. 1988. A contingency view of Porter's generic strategies. *Academy of Management Review* 13 (3): 390–400.
- Nelson, R., and S. Winter. 1982. *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.
- Pfeffer, J., and G. R. Salancik. 1978. *The External Control of Organizations: A Resource Dependence Perspective*. New York, NY: Harper and Row.
- Porter, M. 1980. *Competitive Strategy*. New York, NY: The Free Press.
- Silk, A. 1990. Questionnaire design and development. Technical Note. Boston, MA: Harvard Business School Press.
- Simons, R. 1987. Accounting control systems and business strategy: An empirical analysis. *Accounting, Organizations and Society* 12 (4): 357–374.
- . 1990. The role of management control systems in creating competitive advantage: New perspectives. *Accounting, Organizations and Society* 15: 127–143.
- . 1994. *Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal*. Boston, MA: Harvard University Press.
- . 2000. *Performance Measurement and Controls Systems for Implementing Strategy*. Upper Saddle River, NJ: Prentice Hall, Inc.
- Singh, J. V., D. J. Tucker, and R. J. House. 1986. Organizational legitimacy and liability of newness. *Administrative Science Quarterly* 31 (2): 171–193.
- Stinchcombe, A. L. 1965. Social structure and organizations. In *Handbook of Organizations*, edited by J. G. March, 153–193. Chicago, IL: McNally.
- Strauss, A. L., and J. M. Corbin. 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Second edition. Thousand Oaks, CA: Sage Publications.
- Treacy, M., and F. Wiersema. 1995. *The Discipline of Market Leaders: Choose Your Customers, Narrow Your Focus, Dominate Your Market*. Boston, MA: Addison-Wesley.
- Van der Stede, W. A. 2000. The relationship between two consequences of budgetary controls: Budgetary slack creation and managerial short-term orientation. *Accounting, Organizations and Society* 25 (6): 609–622.
- Willard, G. E., D. A. Krueger, and H. R. Feeser. 1992. In order to grow, must the founder grow: A comparison of performance between founder and non-founder managed high-growth manufacturing firms. *Journal of Business Venturing* 7 (3): 181–195.

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The following table contains information about turnaround time for manuscripts (including revisions) on which editorial decisions were made in the 12-month period ended December 31, 2005. Turnaround time is the number of days between the date that the manuscript was received *and the date of the editor's letter to the author(s)*.

	Number of Manuscripts	Percent	Cumulative Number	Cumulative Percent
0 ≤ Days ≤ 30	84	18.06	84	18.06
31 ≤ Days ≤ 60	183	39.36	267	57.42
61 ≤ Days ≤ 90	140	30.11	407	87.53
91 ≤ Days ≤ 120	49	10.54	456	98.07
121 ≤ Days	09	1.93	465	100.00
Total	465	100.00		

The mean review time was 55.93; the median review time was 77 days.

New Submissions by calendar year (January 1 to December 31)

1992	241
1993	234
1994	231
1995	195
1996	230
1997	195
1998	196
1999	239
2000	260
2001	260*
2002	324
2003	327
2004	307
2005	389

* 2001—in addition to the 260 regular submissions, 68 MSs were submitted to the *TAR* Quality of Earnings Conference.

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An Abstract of about 100 words should be presented on a separate page immediately preceding the text. The Abstract should concisely inform the reader of the manuscript's topic, its methods, and its findings. Keywords and the Data Availability statements should follow the Abstract. The text of the paper should start with a section labeled "I. Introduction," which provides more details about the paper's purpose, motivation, methodology, and findings. Both the Abstract and the Introduction should be relatively nontechnical, yet clear enough for an informed reader to understand the manuscript's contribution. The manuscript's title, but neither the author's name nor other identification designations, should appear on the Abstract page.

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- Dye, R., B. Balachandran, and R. Magee. 1989. Contingent fees for audit firms. Working paper, Northwestern University, Evanston, IL.
- Fabozzi, F., and I. Pollack, eds. 1987. *The Handbook of Fixed Income Securities*. 2nd edition. Homewood, IL: Dow Jones-Irwin.
- Kahneman, D., P. Slovic, and A. Tversky, eds. 1982. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge, U.K.: Cambridge University Press.
- Porcano, T. M. 1984a. Distributive justice and tax policy. *The Accounting Review* 59 (October): 619–636.
- . 1984b. The perceived effects of tax policy on corporate investment intentions. *The Journal of the American Taxation Association* 6 (Fall): 7–19.
- Shaw, W. H. 1985. Empirical evidence on the market impact of the safe harbor leasing law. Ph.D. dissertation, The University of Texas at Austin.
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The following policy has been adopted by the Executive Committee in its April 1989 meeting. "An objective of (*The Accounting Review, Accounting Horizons, Issues in Accounting Education*) is to provide the widest possible dissemination of knowledge based on systematic scholarly inquiries into accounting as a field of professional research, and educational activity. As part of this process, authors are encouraged to make their data available for use by others in extending or replicating results reported in their articles. Authors of articles which report data dependent results should footnote the status of data availability and, when pertinent, this should be accompanied by information on how the data may be obtained."

JANUARY 2007 PLACEMENT ADS

The deadline for information to be included in the "Placement Information" section is two months prior to the date of publication. The Review is published in January, March, May, July, and October. Placement advertising and replies should be sent to the American Accounting Association, 5717 Bessie Drive, Sarasota, FL 34233-2399, ATTENTION: ADVERTISING DEPT. All replies to box numbers should be on separate sheets to facilitate forwarding.

- 101 RUTGERS UNIVERSITY, Camden School of Business, invites applications for two tenure-track positions as Assistant or Associate Professor in managerial/cost, financial/tax accounting or auditing. The candidates for Assistant Professor should have Ph.D. in accounting or should be near completion of their degree. Potential for quality research and effective teaching are expected. Candidates for Associate Professor must have Ph.D. in accounting and must have strong research and effective teaching record. Teaching load is 2/2. A letter of application and *curriculum vita* should be submitted in writing and electronically (kenis@camden.rutgers.edu) to: Professor Kenis, Accounting Area Coordinator, Rutgers University, Camden Campus, School of Business, Camden., NJ 08102. The Camden Campus is located in southern New Jersey with easy access to Philadelphia, Atlantic City, and New York. Rutgers University is an Equal Opportunity Employer.
- 102 UNIVERSITY OF ST. THOMAS MINNEAPOLIS/ST. PAUL, MN invites applicants for a tenure-track Accounting position starting Fall 2007. Primary needs are Cost/Managerial and Financial. The University of St. Thomas offers a B.A., M.B.A., and M.S. in Accountancy. See our website at: <http://www.stthomas.edu>. Candidates should expect to have a Ph.D. or ABD with completion by Summer 2007, D.B.A., graduate degree in taxation, or combination of graduate degrees in law and accounting. Preference will be given to candidates who blend academic credentials and professional experience. Applicants should submit a letter, *curriculum vita*, evidence of teaching ability, a sample of scholarly writing, and three letters of recommendation. Questions or requests for additional information should be directed to: P. Jane Saly, Department of Accounting Chair, Mail #TMH 343, University of St. Thomas, 1000 LaSalle Avenue, Minneapolis, MN 55403-2005; Email: pjsaly@stthomas.edu. The University of St. Thomas is an Affirmative Action and Equal Opportunity Employer
- 103 RICE UNIVERSITY, Jones Graduate School of Management, invites applications for a tenure-track position in Financial Accounting effective Fall 2007. The position is open rank, but applicants at the Associate or Full level with demonstrated excellence in scholarly research and teaching are especially encouraged to apply. Applicants at the Assistant level must have a Ph.D. or be near completion, and should demonstrate strong potential for quality research and teaching. Interested candidates should submit a cover letter, *curriculum vitae*, and copies of recent research and teaching evaluations to: accountingrecruit@rice.edu; or to: Ms. Annepha Pemberton, Accounting Recruiting, Jones Graduate School of Management, Rice University, PO Box 2932, Houston, TX 77252-2932. Review of applications will begin October 1, 2006 and continue until the position is filled. If you have further questions, please contact Karen Nelson at nelsonk@rice.edu. Rice University is an Equal Opportunity/Affirmative Action Employer.

- 104 INDIANA UNIVERSITY-PURDUE UNIVERSITY FORT WAYNE, Department of Accounting and Finance invites applications for chairperson of the department. Candidates must have a Ph.D./D.B.A. and an established record of research. The appointment will be made at Full Professor. Indiana University-Purdue University Fort Wayne is a joint campus of both universities. Undergraduate and graduate business degrees are awarded through IU. The department includes nine full-time faculty and approximately 130 accounting and finance majors. Our department is known for its collegiality, strong programs, and good students. Fort Wayne, Indiana is a city of over 250,000 with a low cost of living, proximity to major cities, and home to many fine arts organizations, museums, and a nationally recognized children's zoo. Applications or letters of inquiry to: Dr. Kathy S. Pollock, Interim Chairperson, Department of Accounting and Finance, Indiana University-Purdue University Fort Wayne, 2101 E. Coliseum Blvd., Fort Wayne, IN 46805-1499. Screening will begin immediately and continue until the position is filled. For more information, visit the website at: <http://www.ipfw.edu/acfn>. IPFW is an Equal Opportunity/Equal Access/Affirmative Action university.
- 105 THE UNIVERSITY OF ALABAMA is pleased to invite applications for the Smith Foundation Chair in Business Ethics and Integrity for an expected appointment date of August 16, 2007. Tenure, rank, and compensation will depend on the qualifications of the candidate. Candidates from all business disciplines will be considered. Minimum qualifications include an earned doctorate in a business-related discipline or a graduate degree and substantial relevant professional experience. Outstanding teaching effectiveness is essential with evidence of a continuing record of exemplary academic or professional citizenship. The chairholder will encourage students to identify, analyze, and gain awareness of ethical issues and reasoning in business management. Candidates for a tenure-track position must have a record of published research in top academic journals and an interest in business ethics, integrity, corporate governance, or related topics. Additional information for candidates is available at: http://cba.ua.edu/about/news/smith_chair/. An Equal Opportunity-Affirmative Action Employer.
- 106 MIDDLE TENNESSEE STATE UNIVERSITY, Department of Accounting, invites applications for three tenure-track faculty positions at the Assistant/Associate Professor rank (position numbers 110030, 110050, and 110090), beginning August 2007. Candidates should possess an earned doctorate in accounting (ABD considered if close to completion). Applicants should have a strong commitment to excellence in teaching, research and publication, and service. Department offers an undergraduate degree in accounting, an M.S. degree in Accounting/Information Systems, and supports the accounting concentration in the M.B.A. program. Department earned separate AACSB accreditation in 2004. MTSU is located in Murfreesboro, one of the fastest growing cities in the State of Tennessee. The application process is online at: <http://www.mtsu.edu/adm/>. Click on "Faculty Position Openings." This process should be available by October 1, 2006. Review of online applications will begin November 1 and continue until positions are filled. Women and minorities are encouraged to apply. MTSU is an EO/AA/AOA/Employer.
- 107 DARTMOUTH COLLEGE, Tuck School of Business at Dartmouth, Dartmouth College's graduate school of management, anticipates faculty searches in accounting. We are open to all levels of appointment: Assistant, Associate, or Full Professor, however, there is a preference for those who have at least three years experience since completing their Ph.D. We are interested in candidates who will produce research of excellent quality that will have high impact on the field. There must be evidence that the candidate can conduct research and teach at a level of quality consistent with Tuck's high standards. Send resumes to: Senior Associate Dean Robert G. Hansen 100 Tuck Hall Hanover, NH 03755 Dartmouth College is an equal opportunity/affirmative action employer and has a strong commitment to diversity. Women, persons of color, persons with disabilities, and veterans are encouraged to apply.

- 108 UNIVERSITY OF NORTH FLORIDA, Department of Accounting and Finance invites applicants for two tenure-track Assistant Professor of Accounting positions (PD 33283 and PD 33396) beginning August 2007. Accounting specialties in financial accounting (both positions), not-for-profit, and accounting information systems, auditing, and international accounting. Ph.D. or D.B.A. in accounting, completed by August 1, 2007, and evidence of teaching effectiveness and research in accounting required. Professional certification desired. Applicants must complete the online application at: <http://www.unfjobs.org> (for each position and will receive a confirmation number for each application) and must mail all required documents, which include a letter of interest, *curriculum vitae*, three letters of reference, unofficial transcripts, teaching evaluations and samples of scholarship to: John MacArthur, Chair, Accounting Search Committee, Department of Accounting and Finance, Coggin College of Business, University of North Florida, 4567 St. Johns Bluff Road South, Jacksonville, FL 32224-2675; Phone: (904) 620-2630. Positions will remain open until filled. AA/EOE.
- 109 DUKE UNIVERSITY, Fuqua School of Business is seeking to fill one accounting faculty position. Hiring decisions will be based on the candidate's ability to contribute to the research and teaching missions of the Fuqua School of Business. Doctoral students and others who are interested in being considered for this accounting faculty position should send a current resume, a paper or a thesis proposal, and the names of references to: Professor Katherine Schipper, Fuqua School of Business, Box 90120, One Towerview Drive, Duke University, Durham, NC 27708. Materials from doctoral students should be received by January 15, 2007; others should send their materials as soon as possible. The Fuqua School of Business is committed to fostering a diverse educational environment and encourages applications from members of groups under-represented in academia. Duke University is an Equal Opportunity/Affirmative Action Employer.
- 110 THE UNIVERSITY OF IOWA, Accounting Department invites applicants for tenure-track appointments beginning Fall 2007. Will consider candidates in all areas at Assistant Professor rank. Will also consider one- or two-year visiting appointments if unable to fill anticipated position(s) with tenure-track faculty. Required qualifications include demonstrated interest in and capacity to do research publishable in top-tier accounting journals, high level of teaching competence, and earned doctorate (entry-level candidates can be near completion). Competitive compensation package. Will screen applicants at all ranks and areas on ongoing basis. To apply, please send a resume, a representative research output, evidence of teaching capabilities, and at least three recommendation letters to: Recruiting Coordinator, Department of Accounting, Tippie College of Business, 108 Pappajohn Business Bldg., Suite W252, The University of Iowa, Iowa City, IA 52242-1994. Women, minorities, and individuals with disabilities are encouraged to apply. The University of Iowa is an Affirmative Action, Equal Opportunity Employer.
- 111 TRINITY UNIVERSITY invites applications for the position of the Jesse H. Jones Distinguished Professor of Accounting within the Department of Business Administration, effective August 2007. The position requires a Ph.D., D.B.A., or equivalent degree in Accounting. An established record of research, a commitment to continued scholarship, and excellence in teaching are required. The teaching load is two courses a semester. The Jesse H. Jones Distinguished Professor will be expected to have an interest in teaching financial accounting theory and regulation. The salary is competitive. The Department of Business Administration at Trinity University is the largest academic unit on campus in terms of student majors and is accredited by the AACSB. The Department offers bachelor's and master's degrees in accounting. Applicants should send a letter of interest, *curriculum vitae*, and a sample of written work to: Dr. Daniel T. Walz (dwalz@trinity.edu), Chair of Search Committee, Department of Business Administration, Trinity University, One Trinity Place, San Antonio, Texas 78212-7200. Review of applications will begin immediately, and the position will remain open until filled. We encourage applications from women and minorities. The University is an Equal Opportunity Employer.

- 112 UNIVERSITY OF LOUISIANA AT LAFAYETTE, B.I. Moody, III College of Business Administration of the University of Louisiana at Lafayette has an opening for the position of Dean. Please see the vacancy notice [AA 1-05] at the University of Louisiana's website: <http://www.louisiana.edu/AboutUs/Positions/FacultyAdmin.shtml>. AA/EEO
- 113 HIGHPOINT UNIVERSITY is seeking applications for a tenure-track Accounting position beginning the Fall 2007. High Point University is a private institution undergoing a \$100 million transformation including two new buildings for the Earl N. Phillips School of Business. The ideal candidate will have a commitment to excellence in teaching and experience in financial accounting, auditing, or accounting information systems. Applicants should have a commitment to research and well-defined research agenda. Candidates should possess a Ph.D. or D.B.A. in Accounting. Professional certification and experience are desired. Rank and salary dependent on qualifications. Interested applicants should send a letter of application, *curriculum vitae*, three references, and transcripts to: Dr. Frankie E. Gurganus, Earl N. Phillips School of Business, High Point University, 833 Montlieu Ave., High Point, NC 27262. Women and minorities are encouraged to apply.
- 114 UNIVERSITY OF NORTH TEXAS invites applications for Coordinator of the Doctoral Program in Accounting. The position is available beginning Fall 2007. Candidates must possess an earned doctorate with an emphasis in accounting and should have teaching experience at the doctoral level and an appropriate record of scholarly publications. Applications will be considered until the position is filled. Candidates should submit a letter of application, *curriculum vitae*, and the names, addresses, and telephone numbers of four references to: Search Committee, Department of Accounting, University of North Texas, PO Box 305219, Denton, TX 76203-5219; or by email: mcqueenc@unt.edu. The University of North Texas, located in the Dallas-Fort Worth metroplex, is a metropolitan research university with an enrollment in excess of 32,000 students. Accounting programs are offered at the undergraduate, master's, and doctoral levels. The University enjoys immediate proximity to DFW International Airport, and the cost of living in the area is exceptionally favorable. Visit <http://www.coba.unt.edu/acct> and <http://www.cityofdenton.com/>. Women and minorities are encouraged to apply. The University of North Texas is an Equal Opportunity Employer.
- 115 UNIVERSITY OF MASSACHUSETTS BOSTON invites applications for two tenure-track positions beginning Fall 2007. Candidates with primary interests in financial accounting, taxation, and international accounting are desired; however, candidates in all areas of interest are encouraged to apply. A Ph.D. in Accounting is required, but ABDs nearing completion will be considered. Send a hard copy cover letter, *curriculum vitae*, names of three references, and research sample to: Chair, Accounting Recruiting Committee, Department of Accounting and Finance, College of Management, University of Massachusetts Boston, 100 Morrissey Boulevard, Boston, MA 02125-3393. UMass Boston is an Affirmative Action/Equal Opportunity/Title IX Employer.
- 116 UNIVERSITY OF VIRGINIA, Accounting Area, McIntire School of Commerce is seeking applications for one or more full-time positions beginning August 2007. The strongest candidates will have expertise in contemporary research practices and topics, as well as demonstrated excellence in teaching financial or managerial accounting at both the graduate and undergraduate levels. Positions open to all ranks. Candidates should have an established record of both strong research and teaching. Review of applications will begin soon and continue until the position is filled. Applicants should send a letter of interest and *curriculum vitae* to: Email: faculty.apps@comm.virginia.edu; or to: Faculty Recruiting, Attn: Heather Cullop, University of Virginia, PO Box 400173, Charlottesville, VA 22904-4173. Mail applications will be processed, but email submissions are highly preferred. The University of Virginia is an Equal Opportunity/Affirmative Action Employer. Information about the McIntire School can be found at: <http://www.commerce.virginia.edu>

- 117 TOWSON UNIVERSITY, College of Business and Economics invites applications for an Assistant Professor of Accounting, beginning August 2007. Applicants should possess a Ph.D. or D.B.A. with a concentration in accounting from an AACSB-accredited university and must provide evidence of, or the potential for, effective teaching and intellectual contributions. ABD candidates for whom completion is expected by February 1, 2008 will also be considered. Additional information can be found at: <http://wwwnew.towson.edu/cbe/>. Interested candidates should submit a letter of application, current *curriculum vitae*, recent teaching evaluations (if applicable), and the names of three references to: Dr. Andrew Schiff, Department of Accounting, Stephens Hall 102, 8000 York Road, Towson, MD 21252-0001; email: aschiff@towson.edu. Review of applications will begin on November 1, 2006. Towson University has a strong institutional commitment to diversity. Women, minorities, persons with disabilities, and veterans are encouraged to apply. Towson University is an equal opportunity/affirmative action employer.
- 118 UNIVERSITY OF WASHINGTON, TACOMA, Milgard School of Business invites applications for a tenure-track position in Accounting at the Assistant/Associate/Full Professor rank for Autumn 2007. All areas of specialization within Accounting will be considered. Applicants must have a Ph.D. in Accounting and a commitment to excellence in scholarship and teaching. Individuals applying at the Associate/Full Professor rank must have an established record of publications in quality academic journals, demonstrated excellence in teaching, and a commitment to service. University of Washington faculty engage in teaching, research, and service. To apply, send a letter of application, *curriculum vitae*, and a list of three references to: tfaculty@u.washington.edu. Screening of applications will begin September 15, 2006 and continue until the position is filled. The University of Washington Tacoma is building a culturally diverse faculty and strongly encourages applications from women and minority candidates, and is an Equal Opportunity/Affirmative Action employer.
- 119 FULLER & THALER ASSET MANAGEMENT, INC. seek a Quantitative Research Analyst. Requires Ph.D. in Accounting (or completion of all requirements for Ph.D. in Accounting, including dissertation) and 1 yr. of experience in data analysis and financial statement analysis utilizing cross-sectional and time-series comparative analysis techniques; application of econometrics, statistical inference, and accrual anomaly techniques to develop financial models; and utilization of SAS, Matlab, and EViews in connection with insider trading analysis, evaluation of financial analyst forecasts, and earnings surprise assessment. In lieu of 1 yr. of experience as stated, will accept coursework, training, or academic research in all above-mentioned areas. Perform exploratory data analysis and financial statement analysis utilizing cross-sectional and time-series comparative analysis techniques in order to develop, test, and enhance existing and new quantitative equity strategies. F/T. Apply with resume to: Fuller & Thaler Asset Management, Inc., Attn. J. Neves, 411 Borel Avenue, Suite 300, San Mateo, CA 94402.
- 120 UNIVERSITY OF TEXAS, PAN AMERICAN Department of Accounting and Business Law in the College of Business Administration invites applications for full-time tenure-track faculty positions in Accounting at the rank of Assistant/Associate Professor beginning Fall 2007. The positions have been approved and are subject to normal budget approval. Salaries are competitive. Review of applications will begin immediately and continue until positions are filled. This position is security sensitive as defined by the Texas Education Code §51.215 (c) and Texas Government Code §411.094(a) (2). For requirements and more information please see: <http://www.utpa.edu/humanresources/employment/coba.html>. Send a letter of interest and a comprehensive resume to: Chair, Search Committee Department of Accounting and Business Law, College of Business Administration, The University of Texas Pan American, 1201 West University Drive, Edinburg, TX 78541-2999. Women and minorities are encouraged to apply. UTPA is an Equal Opportunity/Affirmative Action Employer.

- 121 SAINT LEO UNIVERSITY is one of the largest and most innovative Catholic universities in the United States. The Department of Accounting is seeking qualified candidates for a full-time, tenure-track faculty position at the Assistant Professor level for the 2007–2008 academic year. The successful candidate will possess a doctorate degree in Accounting from a regionally accredited institution with terminal qualifications to teach Accounting at both undergrad and graduate level. A terminal degree from an AACSB institution is desirable. Review of materials begins immediately. Submit letter of introduction, resume, contact information for three professional references, and official transcripts. A values statement that highlights how your teaching and administrative philosophy and practices fit the Mission and Values of Saint Leo University is requested. Saint Leo University, Human Resource MC2327, PO Box 6665, Saint Leo, FL 33574. resume@saintleo.edu; <http://www.saintleo.edu/jobs>. Catholics, women, and minorities are encouraged to apply. Saint Leo University is an Equal Opportunity Employer.
- 122 THE CATHOLIC UNIVERSITY OF AMERICA seeks applications for a tenure-track Assistant Professor position in Accounting beginning Fall 2007. Candidates must have a Ph.D. in Accounting. Candidates must demonstrate strong research and teaching potential. As high-quality undergraduate instruction expected, teaching experience is highly desirable. The Catholic University of America was founded in the name of the Catholic Church as a national center of research and scholarship. Regardless of their religious affiliation, members of the faculty are expected to respect and support the university's mission. Interested applicants should send *curriculum vita*, writing sample, teaching evaluations (if any), and three letters of recommendation to: Dr. M. Sophia Aguirre, Department of Business and Economics, The Catholic University of America, Cardinal Station, Washington, D.C. 20064. Email: Aguirre@cua.edu The Catholic University of America is an Equal Opportunity Employer,
- 123 THE UNIVERSITY OF TEXAS AT SAN ANTONIO, Department of Accounting invites applications for one tenure-track positions at the Assistant, Associate, or Professor of Accounting level beginning Fall 2007, pending budget approval. Responsibilities may include teaching undergraduate, masters, and/or Ph.D. courses. Applications from faculty interested in all areas of teaching and research in accounting are welcome to apply. Preference will be given to candidates can teach tax courses and/or who have worked closely with Ph.D. students. Applicants who are not U.S. citizens must state their current visa status and residency status. For details concerning specific qualifications and application requirements, please consult the full text of the position announcement at: <http://business.utsa.edu/jobs>. Women, minorities, veterans, and individuals with disabilities are encouraged to apply. UTSA is an Affirmative Action/Equal Opportunity Employer.
- 124 STATE UNIVERSITY OF NEW YORK AT BROCKPORT seeks applicants for a tenure-track Accounting position in the Department of Business Administration and Economics, starting in August 2007. Candidates are required to have a Ph.D. or D.B.A. in Accounting or Business Administration with major in Accounting or complete the degree by Fall 2007. Candidates are required to show effectiveness or demonstrable potential for teaching graduate and undergraduate-level accounting courses. Scholarly potential demonstrated by publications or high-quality work in progress and research plan is needed. Rank: Assistant Professor. Preferred qualifications include: completed doctorate from an AACSB-accredited institution, CPA license, and experience teaching courses in forensic accounting or related areas. SUNY at Brockport offers undergraduate programs in Accounting, Business Administration, Finance, International Business, and Marketing. All programs are accredited by AACSB International. We plan to offer a Master of Science Degree in Accounting and Forensic Accounting. The College is located in a large, dynamic business community, near the Lake Ontario shoreline. See our website for full vacancy announcement and to apply. Informal inquiries may be addressed to: Dr. Sandeep Singh at (585) 395-5519 or ssingh@brockport.edu. See our website: <https://www.brockportrecruit.org/applicants/jsp/shared/frameset/Frameset.jsp?time=1159799994190>.

- 125 COLUMBUS STATE UNIVERSITY, D. Abbott Turner College of Business seeks qualified candidates for a tenure-track position in Accounting at the Assistant/Associate Professor rank beginning August 2007. Candidates must show evidence of teaching quality and an active research and publication agenda along with community service. Applicants for rank above Assistant Professor must possess a continuous record of scholarly publication in peer-reviewed journals. The successful candidate will have an earned doctorate in Accounting from an AACSB-accredited institution. ABDs will be considered if completion is expected within one year. Finalists are required to undergo a background check and provide official transcripts prior to campus visits. For full consideration applicants should submit a letter of application, *curriculum vitae*, references, and unofficial transcripts to: Dr. Fonda Carter, Chair Search Committee, D. Abbott Turner College of Business, 4225 University Avenue, Columbus State University, Columbus, GA 31907-5645.
- 126 UNIVERSITY OF COLORADO AT BOULDER, Leeds School of Business invites applications and nominations for a tenured or tenure-track position in Accounting. Candidates must hold a Ph.D., or be close to completing one, in accounting or a related field; have superior accomplishments consistent with their level of experience and requested rank, including scholarly research, teaching ability, promise of future contributions, and effective interaction with faculty colleagues, students, and external constituents. The research interests of our faculty are mainly in the area of archival empirical research in accounting. Compensation and support for research activities are competitive. We will begin reviewing applications immediately and will continue until the position is filled. Electronic applications are encouraged. Interested persons should send a cover letter, a current *curriculum vitae*, the names and addresses of at least three academic references, evidence of excellence in research and teaching, and representative publications or working papers to email below. Professor Frank H. Selto Chair, Accounting and Business Law Division, Leeds School of Business, University of Colorado at Boulder 419 UCB Boulder, CO USA 80309-0419; Email: frank.selto@colorado.edu; connie.blazon@colorado.edu. The University of Colorado at Boulder is committed to diversity and equality in education and employment.
- 127 UNIVERSITY OF ALASKA, FAIRBANKS, Are You Tough Enough for Alaska? Ready to enjoy the great outdoors? The Accounting Program at UAF invites applications at the Assistant or Associate level for a position in auditing and AIS beginning Fall 2007. Visiting appointments will be considered, as well as ABDs if assured of finishing all degree requirements by December 31, 2007. UAF is the primary research institution in Alaska, with all research faculty on 2-2 teaching loads. Senior-level applicants must have demonstrated record of scholarly achievement. Professional certification desired. Competitive salaries with generous retirement contributions. Moreover, there are no FICA deductions and Alaska has no sales or income taxes. Finally, Fairbanks has moderate housing costs and boasts small-town friendliness. For further information, contact: Professor Michael Davis, Director, Accounting Program, 907 474-5872 or by email: fmd1@uaf.edu. Position open until filled, with the first review on October 25, 2006. Applications must be submitted online. PCN 203415. <http://www.uakjobs.com/>. AA/EOE.
- 128 UNIVERSITY OF CALIFORNIA, RIVERSIDE, A. Gary Anderson Graduate School of Management invites applications for one tenure-track faculty position as an Assistant Professor in Accounting to begin July 1, 2007. We seek candidates with highly sophisticated research training who can demonstrate the potential for outstanding accomplishment and scholarly distinction in Accounting. Research area is open but preference will be given to candidates with strong methodological training and analytical theory research. Candidates must have the Ph.D. or expect the degree to be conferred by the date of appointment. Screening of applications will begin on November 27, 2006, and will continue until the position is filled. Interested candidates should send, preferably by email, a *curriculum vita*, three letters of recommendation, and a selected published journal article or research working paper to: Ms. Tanya Wine AGSM, University of California Riverside, CA 92521. The University Of California, Riverside, is an Affirmative Action/Equal Opportunity Employer.

- 129 CHAPMAN UNIVERSITY, Argyros School of Business and Economics invites applications for a tenure-track position in Accounting at the rank of Assistant or Associate Professor available Fall 2007. This position offers a competitive salary and a teaching load of two courses per semester. Research support is guaranteed during the first two summers and is available on a competitive basis thereafter. This position requires a Ph.D. in Accounting and significant promise for scholarly research. Excellent teaching is required and classes are kept small to foster interaction between students and faculty. Chapman University is located in Orange County, California. The Argyros School is fully accredited by AACSB. Applicants should send a cover letter, *curriculum vita*, list of references, and a research manuscript to: Professor Glenn Pfeiffer at email below. Please use "Accounting Faculty Position" in the subject line. Chapman University is committed to providing career opportunities to all people, without regard to race, religion, gender, age, national origin, or disability. Chapman University is an Equal Opportunity Employer,
- 130 MICHIGAN STATE UNIVERSITY, Eli Broad College of Business, Accounting and Information Systems, East Lansing, MI, invites applications for an Academic Teaching Specialist position beginning August 2007. This is a three-year fixed-term academic year appointment. The position is renewable, subject to performance and staffing needs. Summer teaching is available. The area of need is financial reporting or auditing. Candidates must have either a Ph.D. in accounting or a master's degree in accounting with professional certification. Salary will be commensurate with qualifications. Send application letter, *curriculum vita*, names or letters of references, and copies of all teaching evaluations to: Recruiting Coordinator, Accounting and Information Systems N270, Business College Complex, Michigan State University, East Lansing, MI 48824. Review of applications begins October 30, 2006, and continues until position is filled. Persons with disabilities have the right to request and receive reasonable accommodation. MSU is an Affirmative Action /Equal Opportunity Institution.
- 131 MCGILL UNIVERSITY, Desautels Faculty of Management invites applications for tenure-track positions in all areas of accounting and at any rank beginning August 2007. Candidates must have a Ph.D. or be in the final stages of their dissertation. Preferred candidates should have a proven record or should demonstrate high potential for quality research and teaching. Located in downtown Montreal, McGill University is one of Canada's leading research universities and is well known for its academic excellence. In accordance with Canadian Immigration requirements, priority considerations will be given to Canadian citizens or permanent residents but all qualified candidates are encouraged to apply. Applicants should send their *curriculum vitae*, three letters of recommendation, and recent publications/working papers to: Professor Steve Fortin Desautels, Faculty of Management, McGill University, 1001 Sherbrooke St., West Montreal, Quebec, H3A 1G5 CANADA. McGill is strongly committed to diversity in employment and welcomes applications from visible minority group members, women, members of sexual minority groups and persons with disabilities.
- 132 ILLINOIS WESLEYAN UNIVERSITY, Department of Business Administration invites applications for two tenure-track positions in Accounting at the rank of Assistant Professor. The normal teaching load is three courses and two preparations per semester. For these positions, Illinois Wesleyan seeks candidates with doctorates in accounting. ABDs nearing completion and others with extraordinary qualifications are also encouraged to apply. We welcome in particular applicants who can teach in the area of tax. Starting date is August 2007. Salaries will be competitive. To apply, please send a letter of application, *curriculum vitae*, three reference letters, and a transcript to: Robert A. Kearney, Chair, Department of Business Administration, Illinois Wesleyan University, PO Box 2900, Bloomington, IL 61702-2900.

- 133 OAKLAND UNIVERSITY, AACSB-Accounting accredited program invites applications for a tenure-track position in Accounting at the rank of Assistant or Associate Professor, beginning August 15, 2007. A primary interest in audit or managerial/cost accounting, with a secondary interest in accounting information systems, is desirable. Scholarly work is supported and expected. Full details about the position are available at: <http://www2.oakland.edu/provost/web/jobdetail.cfm?ID=259>. To apply for the position, please send *curriculum vitae* to: Accounting Recruiting Chair, Department of Accounting and Finance, School of Business Administration, Oakland University, Rochester, MI 48309. Oakland University encourages applications from women and minorities and is an Affirmative Action/Equal Opportunity Employer.
- 134 THUNDERBIRD, The Garvin School of International Management invites applications for a position in Accounting at the rank of Associate or Full Professor. Qualifications: Expertise in managerial accounting and financial reporting. All candidates must have a Ph.D. and a record of accomplishment in research and teaching. Preference will be given to applicants with established record of excellence in teaching, particularly in M.B.A. and Executive Education programs. International Business experience and Associate rank or higher preferred. Salary will commensurate with qualifications. The successful applicant can join Thunderbird beginning with the Summer or Fall 2007 trimester. Applications for visiting positions for Summer 2007 will also be considered. Information about Thunderbird visit: <http://www.thunderbird.edu/>. Please send a letter of interest, a *curriculum vita*, and supporting research and teaching documents to: Ms. Cheri Hazen, Manager, Faculty Support, Thunderbird, The Garvin School of International Management, 15249 North 59th Avenue, Glendale, AZ 85306-6000.
- 135 CENTRAL CONNECTICUT STATE UNIVERSITY invites applications for tenure-track positions in accounting at the Assistant, Associate, or Full Professor level beginning in or after Fall 2007. Applicants must have an earned doctorate in accounting from an AACSB accredited school or equivalent. Professional certification or experience is desirable. Experience and credentials above this level may be eligible for consideration at the level of Associate or full Professor. Teaching interest in financial, auditing, or AIS preferred. Applicants must have a commitment to excellence in teaching and scholarship. Review will continue until the position is filled. Review of applicants will begin on November 1, 2006, and continue until positions are filled. Send cover letter and resume electronically to: Ms. Donna Stewart at: stewartd@ccsu.edu, Department of Accounting, School of Business, Central Connecticut State University, 1615 Stanley St., New Britain, CT 06050. CCSU specifically invites applications from women and minorities and is an Equal Opportunity Employer.
- 136 ALFRED UNIVERSITY, College of Business invites applications for a tenure-track position at the Assistant Professor level in accounting, beginning in the Fall 2007. The position requires a Ph.D. in Accounting (ABD considered if evidence of completion within one year) or D.B.A. with research interests in Accounting. Teaching will be primarily undergraduate, with the occasional graduate class. The teaching load is three classes per semester. The College of Business is AACSB accredited. We are seeking a candidate who is teaching oriented with research and publication interests consistent with our mission. To apply please send a letter of application, *curriculum vita*, evidence of teaching capabilities (if available) and at least three recommendation letters. Review of applications will continue until the position is filled. Contact: Accounting Search Committee, College of Business, Alfred University, Saxon Drive, Alfred, NY 14802; or email: businesscollege@alfred.edu. Alfred University is an AA/EOE employer.

- 137 ST. JOHN FISHER COLLEGE, an AACSB-accredited School of Business, invites applications for a tenure-track faculty position in accounting. For full text of this ad, please go to: <http://www.sjfc.edu/humanresources/jobs.asp>. The position requires a terminal degree in business, preferably in accounting and preferably from an AACSB-accredited school. ABDs will be considered if applicant is close to completion. The teaching assignment is at both graduate and undergraduate levels. Interested candidates should send application letter, *curriculum vitae*, a summary of recent teaching evaluations, and the names and email addresses of at least three references to: Professor Tom Tyson, Chair, Department of Accounting, Finance and MIS, St. John Fisher College, 3690 East Avenue, Rochester, NY 14618; or email: ttyson@sjfc.edu; Website: <http://www.sjfc.edu/humanresources/jobs.asp>. We actively seek and encourage applications from members of under-represented populations. St John Fisher College is an Equal Opportunity/Affirmative Action employer.
- 138 THE UNIVERSITY OF TEXAS AT ARLINGTON Department of Accounting invites applications for tenure or tenure-track positions at the Assistant or Associate Professor ranks in all areas of accounting to begin August 2007. Applicants must be close to completion or have an appropriate doctoral degree at the time of joining the faculty. All applicants are expected to have a commitment to quality research demonstrated by publishing in nationally recognized "A" journals, teaching excellence, and academic/professional service. All areas of expertise will be considered. The College of Business and Department of Accounting are both AACSB accredited. Review of applications will begin immediately, and continue until the position is filled. A complete resume, working paper, and three reference letters should be sent to: The University of Texas at Arlington, Department of Accounting, Chandra Subramaniam, Search Committee Chair, Box 19468, Arlington, TX 76019. The University of Texas at Arlington is an Equal Opportunity/Affirmative Action Employer.
- 139 FERRIS STATE UNIVERSITY invites applicants for two positions: taxation and accounting systems. Our primary needs are in the areas of taxation and accounting systems. Candidates are expected to teach other areas of accounting at both the lower and upper levels. For the accounting systems position, a Ph.D. in accounting is required. For the taxation position, a Ph.D. in Accounting is required; however, a J.D. with a strong tax background will be considered. Preference will be given to candidates with accounting certification and relevant teaching and business experience. ABDs with substantial progress toward completion will be considered. All applicants must have a commitment to excellence in teaching and scholarship. The College of Business provides a collegial environment with the opportunity to make an immediate contribution. Review of applications will begin immediately and continue until filled. Please submit cover letter (referencing position applying for), resume, names and phone numbers of three current references or three letters of recommendation, and copies of college transcripts to: Dr. Jim Woolen, Department Head, Accountancy, Finance and Information Systems Dept., College of Business, 119 South Street, Big Rapids, MI 49307-2284. For complete position postings, please visit www.ferris.edu/htmls/jobs/. An EO/AA Employer.
- 140 CLEMSON UNIVERSITY seeks a creative, innovative, visionary leader, whose outstanding level of past achievement is matched by his or her potential for future success. The new Dean will build upon the College of Business and Behavioral Science (CBBS)'s accomplishments, guiding the College in its contribution to Clemson's goal of becoming a top-20 public university. Candidates for the Dean's position must possess a distinguished record of achievement, including significant administrative responsibilities. The new Dean will provide leadership across the College to enhance undergraduate and graduate programs, provide advocacy for research, establish strong relationships with constituents inside and outside of the University, and expand the College's fundraising efforts. Candidates are also expected to demonstrate a commitment to diversity and the development of an inclusive campus community. The Dean reports to the Provost (Vice-President for Academic Affairs). Nominations/applications should be submitted to: ClemsonDean@witkiewer.com. For a full position description please go to: http://www.witkiewer.com/education/index.cfm/page/cur_srch/job_id/1221.

- 141 UNIVERSITY OF TORONTO, Rotman School of Management invites applications for faculty positions in Accounting (Assistant or Associate Professor rank, tenure-track or tenured) beginning July 1, 2007. Candidates must have a Ph.D. or be in the final stages of their dissertation and demonstrate interest in and capacity to conduct high quality scholarly research as well as teaching competence. Compensation and benefits at the Rotman School are competitive. The position is subject to budgetary approval. You can visit our website <http://www.rotman.utoronto.ca> (for more information about the Rotman School and the University of Toronto). Please send by January 15, 2007 a letter of application with *curriculum vitae*, publications, research papers, and teaching evaluations as appropriate, as well as three letters of reference to: Professor Ping Zhang Chair, Accounting Recruiting Committee, Rotman School of Management, University of Toronto, 105 St. George Street, Toronto, Ontario M5S 3E6 CANADA. Email: pzhang@rotman.utoronto.ca.
- 142 LONG ISLAND UNIVERSITY-BROOKLYN CAMPUS invites applications for two full-time tenure-track faculty positions in Accounting at the rank of Assistant Professor beginning Fall 2007 in the Department of Accounting, Taxation and Law. All accounting areas will be considered. Minimum Qualifications: Candidates must have an earned doctorate in Accounting from a graduate school of business (AACSB accredited) or be near completion of the degree. In addition, candidates with current CPA, CMA, or CIA are preferred. Teaching experience at the undergraduate and/or graduate levels is desired. Application process: Applications should include *curriculum vitae*, three reference letters, and a job market paper. All material should be sent to: Roberta.Scotto@liu.edu; or send a hard copy to: Search Committee/Accounting Faculty Position, c/o Ms. Roberta Scotto, Department of Accounting, Taxation and Law, Long Island University, One University Plaza H700, Brooklyn, NY 11201. Long Island University is an Equal Opportunity/Affirmative Action Employer.
- 143 UNIVERSITY OF IDAHO, Department of Accounting seeks applicants for tenure-track faculty appointment as Assistant or Associate Professor of accounting beginning July 2007. Teaching emphasis in managerial, information systems, and financial accounting. Salary depends on qualifications and experience. Ph.D. or D.B.A. in accounting and demonstrated interest and/or record of teaching, research and service accomplishments required. Professional certification desired. ABDs will be considered. Applicants should apply online at: <http://www.hr.uidaho.edu> (job seekers) or send applications including a complete resume, a graduate studies transcript, teaching evaluations, and letters from three professional references to: Dr. Teresa P. Gordon, Department of Accounting, University of Idaho, PO Box 443161, Moscow, ID 83844-3161; Phone: (208) 885-6453. Screening will begin immediately. AA/EOE.
- 144 TEXAS SOUTHERN UNIVERSITY, AACSB-accredited Jesse H. Jones School of Business invites applications for two tenure-track positions at the Assistant, Associate, or Full Professor level beginning Fall 2007. Applications in all areas are welcome. A Ph.D. in Accounting (or ABD in advanced dissertation stage) is required. Professional certification and experience are preferred. A successful candidate will demonstrate a commitment to teaching excellence, scholarship, and service. TSU, the second largest historically Black College and University in the nation, is located near the heart of downtown Houston, home to 18 *Fortune* 500 companies. Houston's robust business economy has a strong energy base as well as high-technology industries, medical research, and professional services. To apply, or for more information, contact: Dr. Cathy Claiborne; Texas Southern University, Jesse H. Jones School of Business, 3100 Cleburne St., Houston, TX 77004. Phone: (713) 313-7771; Email: claibornemc@tsu.edu. Apply online at <https://jobs.tsu.edu>.

- 145 BINGHAMTON UNIVERSITY (State University of New York), AACSB-accredited School of Management invites applications for an Assistant Professor position in Accounting for Fall 2007 (subject to budgetary approval). Candidates must have (or expect) a Ph.D. degree and demonstrate the ability to conduct a nationally recognized research program. Quality research is supported with a two course/semester teaching assignment. Current faculty have published articles in *JAR*, *JAE*, *RAST*, *CAR*, *AOS*, *JB*, and other leading journals. More details are available at: <http://som.binghamton.edu/faculty/index.htm>. The University subscribes to WRDS and other standard databases. Located three hours from NYC and one hour from Syracuse and Ithaca, Binghamton is a low-cost-of-living area with 250,000 people. Interested candidates should send a *curriculum vitae* and other supporting documents to: Professor Sara Reiter, School of Management, Binghamton University, PO Box 6000, Binghamton, NY 13902-6000; Fax: (607) 777-4422; Email: sreiter@binghamton.edu. Binghamton University is an Equal Opportunity/Affirmative Action Employer.
- 146 UNIVERSITY OF WATERLOO invites applications for positions in all areas of Accounting for appointments beginning July 1, 2007 or thereafter. Rank is open. The candidate should have a completed or nearly completed Ph.D., an established reputation or demonstrated potential, commensurate with rank, for high-quality research, teaching, and Ph.D. supervision. The University of Waterloo consistently ranks as the leading comprehensive university in Canada. For details about our faculty and programs, please visit: <http://accounting.uwaterloo.ca/>. We encourage applications from all qualified candidates, although Canadian citizens and permanent residents receive priority. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples and persons with disabilities. Please send, electronically if possible, a *curriculum vitae*, a research paper, and names and contact information for three referees to: lola@uwaterloo.ca; or mail to: The Director, c/o Lori Laronde, School of Accountancy, University of Waterloo, Waterloo, Ontario N2L 3G1 CANADA.
- 147 UNIVERSITY OF KENTUCKY, Von Allmen School of Accountancy, in the Gatton College of Business and Economics invites applications for a full-time, Full Professor beginning Fall, 2007 or later. Qualifications: earned doctorate in accounting; record of high-quality academic research in the empirical paradigm; a continuing research agenda; interest in being an integral part of the Ph.D. program in accounting. Teaching area(s) can be customized from: Financial, Managerial, or Governmental Accounting; Forensic Accounting/Auditing; Internal/External Auditing; Financial Statement Analysis; Accounting Information Systems. For consideration, send letter of interest, resume, three references, teaching evaluation samples, and copies of publications or representative research to: Professor Linda McDaniel, Von Allmen Endowed Chair in Accountancy. For confidential inquiries/information: David A. Ziebart, Director of the Von Allmen School of Accountancy, Von Allmen School of Accountancy, Gatton College of Business and Economics, UK, Lexington, KY 40506-0034; Phone: (859) 257-2112. UK is an EOE and encourages applications from minorities and women.
- 148 GEORGIA STATE UNIVERSITY invites applications for two or more non-tenure-track positions at the Lecturer or Clinical Assistant Professor level in the School of Accountancy effective Fall 2007. Candidates must have an earned doctorate (preferred) or master's degree in Accounting (or related field) and demonstrated high-level classroom performance in financial and/or managerial accounting. Those appointed at Clinical Assistant Professor level must have a Ph.D. in Accounting (or related field), significant professional experience, and the capability for publishing research in refereed journals. Salaries are competitive. Positions contingent on budget approval. Send letter of application and *curriculum vitae* to: Dr. Siva Nathan, Search Committee Chair, School of Accountancy, Robinson College of Business, Georgia State University, PO Box 4050, Atlanta, GA 30302-4050. Send electronic submissions to: snathan@gsu.edu. Preference given to applications received by February 1, 2007, but positions remain open until filled. Georgia State University is an Equal Opportunity Educational Institution/Affirmative Action Employer.

- 149 SIENA COLLEGE, Accounting Department invites applications for two tenure-track positions starting Fall 2007. Applications will be accepted and considered until positions are filled. Rank and salary are dependent upon experience and credentials. Ph.D./D.B.A. with concentration in accounting is required; relevant business experience is desirable. Research and professional development activities appropriate to AACSB accreditation and School of Business mission are necessary. Teaching and research in auditing and/or advanced financial accounting is expected. Siena College is an independent liberal arts college in the Catholic and Franciscan tradition, located in New York's Capital District, in close proximity to other major higher education and cultural institutions. The college enrolls 2900 full-time students, 1300 in the School of Business. Please forward applications to: Accounting Search Committee, c/o School of Business, Siena College, 515 Loudon Road, Loudonville, NY 12211-1462. Siena College encourages applications from all qualified candidates and is an Equal Opportunity Employer.
- 150 GRAND VALLEY STATE UNIVERSITY, Department of Accounting and Taxation in the Seidman College of Business invites applications for a new position beginning in Fall 2007. The position is open as to rank and area of specialization. Applicants should have (by August 2007) a doctoral degree in accounting or other equivalent terminal degree appropriate to teach taxation (such as a J.D. plus either Master's in Taxation (M.S.T.) or L.L.M. (tax), or business law (such as a J.D. plus a Masters in Accounting), and a strong commitment to teaching excellence and scholarly research. The Department and College are both accredited by the AACSB. Salary is competitive. Please send a cover letter and resume that includes: (1) educational achievement; (2) research/publication record; (3) indicators of teaching effectiveness or potential; (4) work and other experience; (5) student evaluations or other evidence of quality of teaching, if available, and (6) a list of three references to: Ms. Kathy Goralski, Accounting Search Committee, Department of Accounting and Taxation, Grand Valley State University, 401 West Fulton Street, Grand Rapids, Michigan 49504; or email to: goralskk@gvsu.edu. Review of applicants will begin immediately and will continue until the position is filled. Grand Valley State University is an EO/AA Institution.
- 151 CASE WESTERN RESERVE UNIVERSITY, Weatherhead School of Management, invites applications for Assistant Professor of Accountancy to begin Fall 2007. Required qualifications include a doctorate in Accounting and a strong interest in research. Evidence of quality teaching is desirable. Although candidates with a specialization in any Accounting area are invited to apply, we prefer those interested in the financial and managerial areas. Case currently offers undergraduate and master's level degree programs including a B.S. in Accounting and a Master of Accountancy. In addition, faculty are heavily involved in M.B.A. program teaching and supervision of doctoral students. All programs are AACSB-accredited. Additional information can be found at: <http://weatherhead.case.edu/acct>. Send *curriculum vita* and other materials to: Larry Parker, larry.parker@case.edu. Applications from women and minority candidates are especially welcome. In employment as in education, Case Western Reserve University is committed to Equal Opportunity and World Class Diversity.
- 152 UNIVERSITY OF SOUTH FLORIDA LAKELAND seeks applicants for tenure-track faculty appointment as Assistant or Associate Professor in accountancy (Position #13148). USFL is located 30 miles east of Tampa and 40 miles west of Orlando in the heart of the emerging Florida High-Tech Corridor. The FHTC is attracting high-tech industry in Information Technology; Medical Technologies; Microelectronics; Modeling, Simulation, and Training; and Optics. In 2005-2006 USF Lakeland served over 2,900 students in upper level undergraduate and master's level degree programs. USF Lakeland leads Central Florida as an innovator in education with a focus on the needs of the community and its citizens, playing an important role in community development and advancement. For more information on the University of South Florida, USFL, USF School of Accountancy and the application process, visit the USF website at: <http://usfweb2.usf.edu/HR/Employment/FacultybyTitle.html>.

- 153 CALIFORNIA POLYTECHNIC STATE UNIVERSITY, SAN LUIS OBISPO, Accounting Area of the Orfalea College of Business, invites applications for one or two full-time, academic year Assistant/Associate/Full Professor tenure-track positions in taxation and audit/financial beginning September 2007. For both positions, candidates must be academically qualified under AACSB standards. For the tax position, candidates must have a Ph.D. in Accounting (Taxation) or a L.L.M in Taxation and a CPA. All applicants must demonstrate a strong teaching and research record. To apply, visit: <http://www.calpolyjobs.org>, and complete a required online faculty application. Submit application to Requisition #101108. Please attach a letter of interest, current *curriculum vitae*, and student evaluations, or fax to: Dr. Steven Mintz at (805) 756-6347. Please mail three letters of recommendation to: Dr. Steven Mintz, Chair, Accounting Area, Orfalea College of Business, California Polytechnic State University, San Luis Obispo, CA 93407. Open until filled; for full consideration, apply by January 1, 2007. EEO.
- 154 VIRGINIA MILITARY INSTITUTE, Department of Economics and Business invites applications for a tenure-track position beginning August 2007. We seek candidates who desire to teach undergraduate accounting and finance in a curriculum that emphasizes analytical tools of business decision making. See Institute and department websites at: <http://www.vmi.edu>. Applicants should have completed a Ph.D. or D.B.A. in an appropriate field. Prior industry experience will be viewed favorably. Preference will be given to candidates who can teach in several areas of accounting and financial management. The search will remain open until the position is filled. Applicants should submit a cover letter, *curriculum vita*, copies of graduate transcripts, and the names and contact information of three references. Applications may be sent electronically to: duncanfh@vmi.edu, or by mail to: Col. Floyd H. Duncan, Head—Search Committee, Department of Economics and Business, Virginia Military Institute, Lexington, VA 24450-0304. VMI is an Equal Opportunity Employer.
- 155 MOREHEAD STATE UNIVERSITY is seeking a faculty member in accounting at the Assistant Professor level beginning in August, 2007. Candidates should have a doctorate in accounting; however, ABDs that are close to completion are encouraged to apply. We are open to individuals with teaching interests in any traditional area within accounting. The College of Business is AACSB accredited. The city of Morehead functions as a major medical, educational, cultural, and commercial center of northeastern Kentucky. Additional information can be found at: <http://www.moreheadstate.edu>. For more information, please contact: Terry Elliott, Associate Professor of Accounting, Phone: (606) 783-2735 or by email: telliott@morehead-st.edu. Review of applications will begin August 15, 2006 and will continue until position is filled. To apply, submit letter of application, *curriculum vita*, and references to: Office of Human Resources, Attn: Asst. Prof. Acct. #1371, Morehead State University, HM 101, Morehead, KY 40351. To apply online, visit: <http://www.moreheadstate.edu/hr/index.aspx?id=6045>, and attach required materials. MSU is an EO/AA employer.
- 156 NAVAL POSTGRADUATE SCHOOL, Graduate School of Business and Public Policy (AACSB and NASPAA accredited) seeks all ranks of tenure-track faculty in Accounting and Finance. Applicants must possess good research skills, a doctoral degree in accounting or finance (or close to completion), and evidence of strong commitment to M.B.A. teaching. U.S. citizenship is required for award of tenure. Visiting positions will also be considered. Applications by email preferred; please send covering letter, current resume, and three letters of recommendation or contact information for references to: busapp@nps.edu. Applicants should submit evidence of teaching abilities and scholarship. Attachments should be in PDF or Word (no zipped files please). Applications may also be sent to: Douglas Moses, Senior Associate Dean, Graduate School of Business and Public Policy, Mail Code GB/Mo, Naval Postgraduate School, 555 Dyer Road, Ingersoll Hall, Room 307, Monterey, CA 93943. For more information, visit: <http://www.nps.navy.mil/gsbpp/>. NPS is an Equal Opportunity/Affirmative Action Employer.

- 157 NORTHEASTERN STATE UNIVERSITY, College of Business and Technology seeks applications for two Assistant Professors of Accounting for August 2007, one based on the Tahlequah campus and one based on the Broken Arrow campus. Ideal candidates will have a completed doctorate from a university accredited by AACSB, ACBSP, or equivalent. ABD near completion will be considered. Professional and teaching experience are desirable. Outstanding teaching and mentoring of students are expected. Service, business interaction, and research are encouraged and required for tenure and promotion. Teaching assignments will include undergraduate and graduate classes in the areas of Auditing, Intermediate Accounting, and Cost Accounting. NSU faculty members may be assigned to teach classes as needed on the Broken Arrow, Tahlequah, and Muskogee campuses. Submit Faculty Employment Application Form along with letter of application, *curriculum vitae*, resume, three letters of recommendation, and copies of college transcripts to: Personnel Services, Northeastern State University, Tahlequah, OK 74464-2399.
- 158 UNIVERSITY OF MICHIGAN, Ross School of Business has a tenure-track position available in Accounting starting in the 2007 academic year. The application should include a research paper based on the candidate's dissertation, any other published or unpublished research, evidence of teaching experience (if any), and a *curriculum vita* that includes three references. Applications should be sent by mail only to: Ms. Pamela Russell, Stephen M. Ross School of Business, University of Michigan, Room W7738, 701 Tappan Street, Ann Arbor, MI 48109-1234. The University of Michigan offers competitive salary and fringe benefits and is an Affirmative Action/ Non-Discriminatory Employer.
- 159 UNIVERSITY OF MINNESOTA, Department of Accounting, Carlson School of Management invites applications for the Carl Nelson Professor of Accounting. We are seeking a scholar who has achieved national recognition in the field of empirical capital markets accounting research and is committed to excellence in accounting teaching. Applicants must have an established record of publications in top-tier academic journals and demonstrated excellence in teaching. Review of applications begins November 15, 2006 and will continue until the position is filled. Applications must include a *curriculum vita*, two samples of recent research papers, and evidence of teaching quality. Candidates must possess a doctoral degree in Accounting or a related discipline. Initial consideration of all applications will be conducted confidentially. Finalists will be asked to provide references. Applications should be sent to: Recruiting Committee Chair, Department of Accounting 3-122, Carlson School of Management, 321 19th Avenue, South Minneapolis, MN 55455. The University of Minnesota is an Equal Opportunity Educator and Employer.
- 160 UNIVERSITY OF THE PACIFIC, Eberhardt School of Business invites applications for a non-tenure-track clinical faculty position beginning Fall 2007 in the area of Accounting. Duties Associated with the position include teaching at the undergraduate and graduate levels as well as service commitments. A Ph.D. or D.B.A. in Accounting is highly desirable. The University of the Pacific was established in 1851 as the first chartered institution of higher learning in California. It is comprised of nine schools and colleges, and is located on three campuses in Stockton, San Francisco, and Sacramento. Stockton, California, the home of Pacific's main campus, is located midway between the San Francisco Bay Area and the Sierra Nevada Mountains. Contact: Dr. Eric Typpo, etyppo@pacific.edu; Eberhardt School of Business, University of the Pacific, 3601 Pacific Avenue, Stockton, CA 95211; Phone: (209) 946-2260; Fax: (209) 946-2586. The University of the Pacific is an EEO/AA, encouraging excellence through diversity.

- 161 CHINESE UNIVERSITY OF HONG KONG, School of Accountancy invites applications for the posts of Professor(s)/Associate Professor(s)/Assistant Professor(s)/Visiting Scholar(s) (Ref. 06/196(020)/2). Applicants should have a Ph.D. degree (or close to completion) and strong commitment to scholarly research and teaching. Appointments will normally be made on contract basis for one to three years initially commencing August 2007, leading to longer-term appointment or substantiation later subject to mutual agreement. Applications will be accepted until the posts (in financial accounting, management accounting, auditing, taxation, and accounting information system) are filled. Please send full resume, a publication list and/or abstracts of selected published papers, and pertinent application materials to: Professor T. J. Wong, Professor of Accountancy, School of Accountancy, CUHK, Shatin, N.T., Hong Kong; or email: tjwong@cuhk.edu.hk. Please quote the reference number and mark "Application—Confidential" on cover. More details are available at: <http://www.cuhk.edu.hk/personnel>.
- 162 BUENA VISTA UNIVERSITY, Harold Walter Siebens School of Business seeks applicants for an accounting faculty position. For tenure-track consideration, a Ph.D./D.B.A. in Accounting or Accounting Information Systems is required. Applications from ABDs/Master degree holders with accounting certification(s) and complementary experience are welcomed. Teaching in the areas of financial, managerial, auditing, cost, accounting information systems, governmental/nonprofit, and certification-preparation is expected. Commitment to high-quality teaching and academic advising is required. Send a cover letter outlining your interest in the position, *curriculum vita*, names of four references including their position title, address, telephone number, and relationship to applicant, unofficial graduate transcripts, teaching evaluations, and your statement of teaching philosophy to: Dr. Mary Gill, Associate Dean of Faculty, Buena Vista University, 610 West Fourth Street, Storm Lake, IA. 50588. Review of applications will begin November 20, 2006. Women and minorities are strongly urged to apply. ADA/EOE.
- 163 THE UNIVERSITY OF TEXAS AT DALLAS invites applications for a faculty position in Accounting, effective September 2007. Appointment at Assistant, Associate, or Full Professor level will be considered. Appointees must have (or expect) a Ph.D. or equivalent and demonstrate the ability to conduct a nationally recognized research program. Applicants should send a complete *curriculum vitae* and names and addresses of three references to: Academic Search #4126, The University of Texas at Dallas, PO Box 830688, M/S AD 42, Richardson, TX 75083-0688. Indication of ethnicity and sex are requested as part of the application, but not required. For more information, visit: <http://www.som.utdallas.edu/aim>, or contact Ashiq Ali, Ashbel Smith Professor, Phone: (972) 883-6360; Email: ashiq.ali@utdallas.edu. UTD strongly encourages applications from candidates who would enhance the diversity of the university's faculty and administration and is an AA/EO university.
- 164 CENTRAL MISSOURI STATE UNIVERSITY invites applications for an Associate or Full Professor to begin August, 2007 to direct department with undergraduate and master's degrees in Accounting. Strong record of scholarship, teaching, and administrative skills, effective communication skills, excellent organizational and leadership skills as well as knowledge of, and experience with, AACSB accreditation standards is highly desirable. Duties include responsibility for curriculum, budget and personnel functions, and for regular management functions necessary for the effective and efficient operation of the department. Chairperson is also responsible for facilitating and promoting a strong collegial and intellectual atmosphere in the department. Please visit: <http://www.cmsu.edu/hr/faculty/>, for more details on this position. Send a current *curriculum vita*, the names, addresses (postal and email) and phone numbers of three academic references, and a letter addressing qualifications to: Dr. Janice Klimek, Chair, Search Committee, Department of Accounting, University of Central Missouri, Warrensburg, MO 64093. Review of applicants begins December 1, 2006. AA/EO/ADA.

- 165 SAGINAW VALLEY STATE UNIVERSITY, Department of Accounting is seeking applicants for the following positions: Assistant Professor, tenure-track position beginning Fall 2007. Ph.D. in accounting or a related field from an AACSB accredited University. Individuals who are ABD and near completion may be considered. Assistant Professor, one-year temporary position beginning January 2007 (Winter Semester). Master's degree with CPA designation required. Earned doctorate in accounting or related field from an accredited preferred. For further information and to apply for these positions please visit: <http://www.jobs.svsu.edu>. Interested individuals must apply online at: <http://www.jobs.svsu.edu>. SVSU is an EO/AA employer.
- 166 MIDWESTERN STATE UNIVERSITY, Accounting Department invites applications for a tenure-track faculty position commencing Fall 2007. A doctorate (or short-term ABD status) in accounting or a terminal degree with a specialization in tax is required. Appropriate professional certification is preferred. The successful candidate will have a record of teaching excellence in tax and financial accounting and a portfolio of intellectual contributions consistent with AACSB accreditation standards. Appointment will be at the rank of Assistant Professor; salary is competitive. Interested candidates should send a letter of application, current *curriculum vitae*, unofficial transcripts, and a list of three references to: Dr. Ralph Fritzsche, Chair, Department of Accounting, Dillard College of Business Administration, Midwestern State University, 3410 Taft, Wichita Falls, TX 76308. BEO/ADA.
- 167 UNIVERSITY OF MEMPHIS, School of Accountancy invites nominations and applications for the position of Assistant Professor of Accountancy starting Fall 2007. Qualifications include an earned doctorate in accounting (advanced ABD applicants will be considered), and a commitment to excellence in teaching, research, and service. We are particularly interested in candidates who have teaching and research interests in auditing and accounting systems. Screening of applicants will begin December 15, 2006 and continue until the position is filled. Please contact: Dr. Ken Lambert, Director, School of Accountancy, University of Memphis, Memphis, TN 38152; Phone: 901-678-4569; Email: klambert@memphis.edu. The University of Memphis, a Tennessee Board of Regents Institution, is an Equal Opportunity/Affirmative Action employer.
- 168 LOUISIANA STATE UNIVERSITY, Department of Accounting in the E. J. Ourso College of Business, invites applications for one or more anticipated tenure-track openings at the rank of Assistant Professor to begin August 2007. Applications will be considered in all areas of specialty. Required qualifications: Doctoral degree in Accounting completed, or near completion, by the date of appointment (if degree is not completed by date of appointment, rank will initially be at the Instructor level). Additional qualification desired: CPA. Responsibilities: teaches undergraduate and graduate courses; be actively involved in academic research; provides service to the profession and the University. An offer of employment is contingent on a satisfactory pre-employment background check. Applications will be accepted until April 13, 2007 or until candidates are selected. Please send a letter of application, *curriculum vitae* (including email address), and three references to: Dr. Barbara Apostolou, Chair, Department of Accounting, 3101 CEBA Building, Louisiana State University, Ref: Log #0796, Baton Rouge, LA 70803. Phone: (225) 578-6222. LSU is an Equal Opportunity/Equal Access Employer.
- 169 TENURED PH.D. (accounting) licensed CPA, Fulbright award recipient with record of publications, willing to consider interesting opportunities in U.S. and abroad, especially in Canada, Latin America, or Europe. Current research interest: corporate governance in developing and developed economies. Intellectual interest: business policy and public policy implications of accounting and control. Primary teaching areas: financial (M.B.A.) and tax. Secondary teaching areas: theory, control, international, and governmental. Have some administrative experience. Prefer to work with graduate students and motivated undergraduates in setting that promotes collaboration and exchange of ideas. Available Fall 2007 or 2008. Tenure or six-year contract essential.

- 170 GEORGE MASON UNIVERSITY, School of Management, invites applications and nominations for Accounting faculty tenure-track positions at all ranks. Special consideration will be given to candidates with teaching and research interests in Managerial Accounting, Taxation, and Corporate Governance. Successful candidates will have a Ph.D. and a strong commitment to excellence in teaching and scholarly research. Located in Fairfax, Virginia just outside Washington, D.C., the School of Management and Accounting Program are accredited by AACSB-International. The School of Management offers undergraduate degrees in business, including accounting, and the M.S.A., M.B.A., E.M.B.A., and Technology Management degrees at the graduate level. Information about the School of Management is at: <http://www.som.gmu.edu>. Applicants must apply online for position F8828Z at: <http://jobs.gmu.edu>. Letters of nomination or recommendation should be mailed or submitted electronically to: Dr. Sarah E. Nutter, Accounting Area Chair, George Mason University, M.S.N-5F4 4400, University Dr., Fairfax VA 22030.
- 171 AMERICAN UNIVERSITY OF BEIRUT, Suliman S. Olayan School of Business is seeking applicants to faculty positions in Accounting at all academic ranks. Candidates should have completed the Ph.D. degree by the time of appointment and, depending on rank, built a scholarly track record involving teaching and published research output together with an ongoing research agenda. Position available: September 15, 2007. Salary and benefits: Internationally competitive packages. To apply send (electronically or by mail) by January 10, 2007 the latest, a letter of application, detailed up-to-date *curriculum vitae*, and three letters of recommendation to: Mrs. Hala K. Azar, Assistant to the Dean, Suliman S. Olayan School of Business, AUB, Bliss Street, PO Box 11-0-236, Beirut, Lebanon; Fax: 961 (1) 750214; Email: ha01@aub.edu.lb. AUB is a private non-profit, equal opportunity institution of higher learning registered in the State of New York and accredited by Middle States. It dates back to 1866 and has been the leader in business education in the Middle East since 1900.

Berry College invites applications and nominations for the position of Dean, Campbell School of Business. Recently accredited by AACSB and selected for inclusion in the 2008 edition of *The Princeton Review's Best Business Schools*, the Campbell School is committed to an outstanding undergraduate business program grounded in the liberal arts. In addition, the school emphasizes outreach in the region, including its MBA program, which supports the undergraduate program and seeks to meet the needs of the region for an advanced business degree. The school offers majors in accounting, economics, finance, management, and marketing. Along with the deans of Academic Services, the Charter School of Education and Human Sciences, the Evans School of Humanities and Social Sciences, the School of Mathematical & Natural Sciences, and Student Work and Experiential Learning, the dean reports to the provost.

Berry is committed to rigorous undergraduate liberal arts programs and to accredited professional programs in education and business which are grounded in the liberal arts. The dean supports faculty who are dedicated to undergraduate teaching, maintaining active research agendas, and sharing in the governance of the institution. The dean encourages undergraduate scholarship, promotes international programs, strives for greater diversity among faculty and staff, and supports Berry's mission in all areas of the college. A terminal degree is strongly preferred. Candidates should possess a record of outstanding teaching, scholarship, and administrative experience. The CSOB dean will work with the Dean of Admissions and Financial Aid to increase the number of business majors, with Advancement to raise funds, as appropriate, to support the work of the school, and with the campus community to build collaboration and mutual support.

Berry College is a comprehensive liberal arts college located 65 miles northwest of Atlanta in Rome, Georgia. Situated on 28,000 acres in the foothills of the Smokey Mountains, Berry is ranked by U.S. News and World Report among the top regional liberal arts colleges in the South. Berry has been rated as a "Best Buy" by both *Barron's* and *Money Magazine*. Its mission stresses academic excellence, practical work experience, and an interdenominational religion-in-life program. Berry is an Equal Opportunity Employer. To be considered, applicants should send a letter of application, current curriculum vitae, evidence of current teaching effectiveness and scholarship, three letters of recommendation, and other relevant supporting documents to: Nancy Johnston, Campbell School of Business, Berry College 2277 Martha Berry Highway, NW, Mount Berry, GA 30149-5024. Review of applications will begin February 1, 2007 and continue until the position is filled.

Taxation and Audit/Financial

The Accounting Area of the Orfalea College of Business, Cal Poly, San Luis Obispo, California, invites applications for one or two full-time, academic year Assistant/Associate/Full Professor tenure-track positions in taxation and audit/financial beginning September 2007. For both positions, candidates must be academically qualified under AACSB standards. For the tax position, candidates must have a Ph.D. in Accounting (Taxation) or an LL.M in Taxation and a CPA. All applicants must demonstrate a strong teaching and research record. To apply, visit WWW.CALPOLYJOBS.ORG and complete a required online faculty application. Submit application to Requisition #101108. Please attach a letter of interest, current curriculum vitae, and student evaluations, or fax to Dr. Steven Mintz at 805-756-6347. Please mail three letters of recommendation to: Dr. Steven Mintz, Chair, Accounting Area, Orfalea College of Business, California Polytechnic State University, San Luis Obispo, CA 93407. Open until filled; for full consideration, apply by January 1, 2007. EEO.



Department of Finance & Accounting
Accounting Faculty Positions

The Department of Finance and Accounting, NUS Business School (www.bschool.nus.edu), invites applications for accounting tenure track positions at all ranks (Assistant/Associate/Full) beginning July 2007. All accounting-related disciplines will be considered. Candidates should possess a Ph.D. or be close to completion. Selection for senior ranks will be based on publications and teaching performance. Selection for the junior rank will be based on potential for publications in tier one journals and quality teaching.

Quality research is strongly encouraged. Our accounting faculty have published in leading journals such as TAR, JAR, and CAR. The school has a wide collection of databases including Compustat, CRSP, Datastream, and IBES, and provides excellent funding support for research and conferences. Reduced teaching load is available to new hires.

We offer competitive salaries, subsidized housing and educational allowances for staff with children.

Please send in a CV and three letters of recommendation to:

Associate Professor Michael SHIH
Department of Finance and Accounting
NUS Business School
1 Business Link
Singapore 117592
Email: fnbbox1@nus.edu.sg

College of Business – University of Illinois at Urbana-Champaign

The University of Illinois at Urbana-Champaign seeks an Executive Director to provide overall leadership for the Center for Professional Responsibility, recently established in the College of Business with an endowment of \$8 million. The mission of the Center is to provide national leadership and vision in developing and interpreting societal expectations of professional responsibility and accountability; to create scholarly and teaching resources regarding ethics, corporate governance, regulatory issues, and the required competencies of business-related professionals; and to raise the level of public awareness and expectations regarding the responsibility of professionals in society.

The Executive Director will work closely with the Center's external and internal advisory boards, campus and College leadership, faculty, and corporate partners to further the goals of the Center by supporting research and curriculum development, organizing conferences and symposia, and offering experiential learning opportunities for students. The Executive Director must be experienced and comfortable in dealing with media and to be a spokesperson for the Center to external and internal audiences.

It is expected that the Executive Director will have considerable leadership experience and a record of educational and professional achievements that will give credibility with the various stakeholders of the Center. The ideal candidate may be a former or current faculty, university administrator, business professional, officer of governmental or regulatory agencies, or jurist.

A MBA (or master's in related field) required; PhD or other terminal degree preferred. The position may be located in Chicago or in Champaign-Urbana. Salary will be commensurate with experience. Start date and percentage appointment are both negotiable. To ensure full consideration, a cover letter, resume, and the names and contact information of three professional references must be received by December 29, 2006 (application deadline). Please send documents to the following address: Chair, Executive Director Search Committee (c/o Fonda Bowden), 260 Wohlers Hall, 1206 S. Sixth Street, Champaign, IL 61820. Electronic applications may be submitted to fbowden@uiuc.edu.

The University of Illinois is an Affirmative Action/Equal Opportunity Employer.

FINANCIAL REPORTING AND BUSINESS COMMUNICATION

ELEVENTH ANNUAL CONFERENCE

AT

**CARDIFF BUSINESS SCHOOL
5 AND 6 JULY 2007**

CONFERENCE ANNOUNCEMENT AND FIRST CALL FOR PAPERS

GUEST SPEAKER: PROFESOR JAMES GUTHRIE
UNIVERSITY OF SYDNEY

We are pleased to announce the Eleventh Annual Financial Reporting and Business Communications Conference. This conference continues to address key questions of interest to accounting academics and practitioners, such as:

How effective is financial reporting?

What role does financial reporting play in corporate governance?

What is the purpose of the modern corporate report?

How can financial reporting contribute to sustainability?

Can financial communication be neutral?

A conference will be held at Cardiff Business School on 5 and 6 July 2007 to discuss these and related topics. Papers are invited on all aspects of **Financial Reporting and Business Communication**. This includes empirical, case study and review articles on such topics as the **measurement, disclosure, presentation, communication and impact** of financial and business information contained in the annual reports and other business documentation in both the private and public sectors. Organisational, historical and international studies are welcomed. Details, including the titles of a selection of papers presented at previous conferences can be found at:

http://www.cardiff.ac.uk/carbs/conferences/past/frbc_2006.html

Should you wish to have a paper considered for presentation at the conference, please send a 500 word abstract to the organisers by 2 March 2007. Mike Jones (☎ +44 (0)29-20874959 Email: JonesM12@Cardiff.ac.uk) or Howard Mellett (☎ +44 (0)29-20875704 Email: Mellett@Cardiff.ac.uk) Cardiff Business School, Colum Drive, Cardiff, CF10 3EU, UK. Fax: +44 (0)29-20874419

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Who We Are

Cornerstone Research is a leading economic consulting firm that specializes in analyzing economic, financial, accounting, and marketing issues. Our diverse staff of more than 400 work side by side with nationally prominent faculty who testify as expert witnesses, analyzing complex business issues that arise in litigation.

Cornerstone Research is involved in a broad variety of cases, and our work has involved highly visible events and legal issues. Some of our recent cases have involved securities fraud claims, allegations of improper accounting practices, insider trading allegations, alleged mutual fund market timing, allegations of price fixing in large commodity markets, and high-tech patent infringement claims.

Associates and Project Managers at Cornerstone Research

Cornerstone Research provides an interesting and rewarding work environment. Associates and project managers work directly with esteemed faculty experts in a distinctive "partnership" that combines the strengths of the academic and business worlds. Cornerstone Research provides opportunities for associates and managers to develop as testifying experts if they are interested in such a career path.

Associates are central to case work at Cornerstone Research and are involved in all phases of a project. In the initial stages, associates actively participate in the formulation of the work plan and the analysis of issues. As the case progresses, associates handle the complex aspects of a case directly, while managing and advising analysts. They work with senior staff, experts, and clients to develop case strategy and to determine how best to communicate our findings. In addition, associates actively participate in shaping and implementing the firm's recruiting, training, and practice development strategies. Project managers have substantial experience in case work and are directly responsible for formulating work plans and directing all aspects of a case. Cornerstone offers an excellent package of interesting work, exposure to a broad set of issues in accounting, economics, and finance, a high degree of personal responsibility, and competitive compensation.

Candidate Profile

We are interested in hiring candidates for our offices in Boston, MA, Los Angeles, CA, Menlo Park, CA, New York, NY, San Francisco, CA and Washington, DC. We seek Accounting Ph.D. candidates with the ability to apply academic research to real world issues, present concise explanations of complex analyses, and independently manage projects and junior staff. Positions are available for candidates currently completing their Ph.D. program, as well as for more senior candidates with additional private sector or academic work experience. The ideal candidate will possess a strong empirical background in Financial Accounting, Cost Accounting, or Auditing, technical expertise in accounting, and excellent interpersonal skills. CPAs are strongly encouraged to apply. Compensation commensurate with experience. Web page: <http://www.cornerstone.com>

Interested candidates should send a cover letter that includes a statement describing your interest in economic consulting and location preference, a resume, a sample research paper, and letters of reference via e-mail to associate-recruiting@cornerstone.com or to:

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